CHILD HEALTH IN A TRI-ETHNIC RURAL AREA

An EPSDT Demonstration
in the
Checkerboard Area
of
New Mexico

1973-1976

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A Demonstration supported by SRS Grant No. 11-P-57220/6 to the
Presbyterian Medical Services, Santa Fe, New Mexico

A REPORT OF

THE HEALTH SERVICES RESEARCH INSTITUTE

THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT SAN ANTONIO

May 1978

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CHILD HEALTH CARE IN A TRI-ETHNIC RURAL AREA

An EPSDT Demonstration
in the
New Mexico Checkerboard Area
Under the Auspices of
The Checkerboard Area Health System
and the
Presbyterian Medical Services

by

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ACKNOWLEDGEMENTS

At the termination of a project such as the one described in this report, one becomes rather acutely aware of all the persons who contributed to the effort. It is impossible, of course, to specifically identify them all; however, special appreciation goes to the children and parents of the Checkerboard for their cooperation in this undertaking. A heavy debt is owed the teachers and school administrators of the Checkerboard whose support and cooperation made this work possible. Appreciation also goes to the staff of the Checkerboard Area Health System (CAHS) for all its help, and to the many volunteers of the Checkerboard communities who served the project in many ways. Particular thanks goes to Richard L. Kozoll, M.D., M.P.H., Medical Director of CAHS, for his interest and participation in the project. Through his efforts many of the lessons learned from the EPSDT project were incorporated in a new school health/screening program for Checkerboard schools. Finally, we are grateful for the support of Dr. Elizabeth Kramm, the Project Officer; and Dr. Helen Martz, who provided the initial stimulus for the Project. Much appreciation also goes to Dr. Otto Reid, Ms. Beatrice Moore, and Ms. Frances LaRiviere for their interest in this work.

CREDITS

The photographs in the report were made and contributed by Evelyn Lopez, Cecilia Rafael, Edward King, and Sally Davis. The cover design was created by Karen Hankla, R.N., a member of the project staff.

PREFACE

This report is the outcome of a three year collaborative effort among many people. The report and the study it describes are somewhat unique in that they are the joint products of a project director, Sally Davis, and a project evaluator, Harold D. Dickson, who represented different organizations and had different responsibilities in the project. The project evaluation was not conceived as a process by which an external agent, the evaluator, would dispassionately apply objective methods to determine the extent to which project objectives were or were not being attained. Rather, the goal of the evaluation was to help the project to more effectively accomplish its objectives. To this end, a detailed knowledge of the project's operation was necessary on the part of the evaluator. Throughout the duration of the project there was active communication between the project and the evaluation team.

The goal of the project was fourfold: first, to conduct an EPSDT medical (including dental) and developmental (intellectual functioning, visual-motor perception, English language facility, and emotional adjustment) screening demonstration of school children in the Mew Mexico Checkerboard Area; second, to design and implement a computerized information retrieval system to be applied to the results of that demonstration; third, to describe and analyze the results of this retrieval process; and fourth, to apply an economic cost analysis to the results. In this report we have provided a process account of the actual implementation of the demonstration as well as descriptions of the results and costs.

CHAPTER ONE

THE CHECKERBOARD AND EPSDT

The Early and Periodic Screening, Diagnosis and Treatment (EPSDT) demonstration described in this report was funded through an 1115 grant[1] to the New Mexico State Department of Health and Social Services in August, 1973. The demonstration was conducted in the New Mexico Checkerboard, as a part of the Checkerboard Area Health System (CAHS), a rural health program of the Presbyterian Medical Services (PMS) of Santa Fe. In the first year (1973-1974) the project was funded for developmental screening only; for the second and third years, the grant was amended to provide funds for both developmental and medical screening. Thus, developmental screening continued over the three years of the project and medical screening over two years.

The amendment to provide medical screening included a proposal for the Cuba project to become part of a Common Data Base system under development by the Regional Health Services Research Institute (HSRI) of The University of Texas Health Science Center at San Antonio, Texas. The data base was to facilitate comparisons of experience and findings among several demonstrations located in widely separated and diverse conditions in the nation, and to serve an evaluation function with particular emphasis upon cost analysis and description of screening outcomes.

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[1]These grants permit certain waivers for the conduct of experimental, demonstration or pilot projects. The grant was awarded by the Social and Rehabilitation Service of the Department of Health, Education and Welfare, now the Health Care Financing Administration.

The remainder of this introductory chapter provides the reader with a description of the natural and cultural terrain of the New Mexico Checkerboard as a backdrop for understanding the project, its operational ambient, and its findings. This account is then followed by a description of the project itself in terms of its goals, operational characteristics, and organizational structure.

The Checkerboard and its People

The Area

The Checkerboard is a region of some 6,000 square miles located in northwestern New Mexico. New Mexico is the fifth largest state in the nation in land area; however, its population numbers only 1,000,000, making it smaller than many of our larger cities. The state, though endowed with much natural beauty, is not well off economically; it ranks 48th among the states in per capita income. Much of the state is rural and one quarter of its population resides in villages of less than 1,000 persons.

The Checkerboard, so named because of the checkered pattern of ownership-- Federal and State governments, Navajo Indians, the Spanish population, and Anglos -- covers parts of four counties and has no natural or politically defined boundaries. The approximate boundaries of the area are outlined on Map No. 1. The pattern of ownership developed at the time the Santa Fe Railroad placed its line through the area in the 1880s. The Federal government awarded rights-of-way along the rail route, and the people living along the route were given land elsewhere. Cuba, the largest community and the hub of the Checkerboard, has a population of about 800 and lies some 90 miles north of Albuquerque and midway between Albuquerque and Farmington.

Most of the area is arid with sparse vegetation which has suffered from overgrazing. The brilliantly colored mesas are dissected by arroyos and washes which remain dry except for spring thaws of winter snow and the flash floods which come with summer storms. In sharp contrast to the semi-desert, the forest covered Nacimiento, the San Pedro and the Jemez Mountains rise to the east. The village of Cuba is located where the mountains and the mesas meet.

The Checkerboard region is economically depressed: 84% of its population is on the borderline or below the federally defined poverty level. The annual per capita income for Sandoval County, which comprises much of the Checkerboard, is estimated at $991.00 by the New Mexico State Planning Office. The population of the area is estimated at 15,000 to 20,000 and approximately half of the people have less than eight years of schooling, and in Sandoval County, only 9% of the males 25 years old or over have completed high school.

The Checkerboard Area Health System had 2,356 families enrolled in 1974.[2] The income of 877 (37.2%) of these families was known. Although some 11% reported annual incomes of $10,000 or over, 30% had incomes of less than $2,000, and 50% less than $4,000. In spite of low incomes, the number of persons on Medicaid was extremely low.[3] For example, the 2,356 families registered in the CAHS represented some 8,944 individuals. Of this number, 168 (1.9%) persons were on Medicaid.

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[2]According to a report dated June 1974, DHEW 314-E titled "Comprehensive Health Services Information System for the Checkerboard".

[3]The reasons for this are rather complex and a discussion of them would be somewhat afield for this report. However, some systematic study of this situation should lend valuable insight into problems of delivery of health and welfare services to rural populations ethnically and culturally different from the larger population of the society.

The People

The people of the Checkerboard are as varied as its topography. The Navajo who live in the desert-like mesa area account for 65% of the population. Descendants of the early Spanish explorers and settlers live principally in villages in the mountains and make up 30% of the population. The remainder of the people, about 5%, are Anglos who reside primarily in three small villages--Cuba, Lindrith, and Regina.

The Navajo: The Navajo are part of the largest and fastest growing tribe in the United States. There are approximately 140,000 Navajos in Arizona, Utah, Colorado, and New Mexico. Historically, the Navajo migrated into the Southwest sometime before the fourteenth century. The "Dineh" or "the people", as they call themselves, were hunters and gatherers who traveled in small bands. They had no livestock and did no farming. Sometime in the 1600's they acquired both horses and sheep from the Spanish settlers who followed the conquistadores into the Southwest. The acquisition of horses changed the Navajo way of life; they soon became a powerful tribe of raiders who took what they needed from neighboring Pueblo tribes and the new settlers from Spain. They often captured Pueblo women from whom they learned various skills including weaving, and adopted the Pueblo's matriarchal structure and religion. From the Spanish settlers they learned about livestock and silversmithing.

An extended period of warfare and unrest arose as more and more settlers from Spain and the eastern areas of the United States moved into the Southwest. Finally, army troops under the leadership of Colonel Kit Carson put an end to the Navajo raids by burning their orchards and killing their sheep. He rounded up the "Dineh" and marched them to Fort Sumner some 300 miles from their home

territory. The incarceration of 5,000 Navajos lasted for over four years. The hardships endured during that experience created a bitterness toward "Belagona" (white man).

In 1868 the Navajos made the long walk back to their homeland. The boundaries of the land set aside as a reservation for them have been modified from time to time but the largest portion of the land lies in eastern Arizona and northwestern New Mexico. The Checkerboard Area is adjacent and to the east of the Navajo reservation, and the Navajo children taking part in the screening represent off-reservation families.

The Navajos in the Checkerboard live in family "camps" scattered across the barren mesas. The typical dwelling is a one-room hogan made from any available natural materials, such as clay, logs, and rocks. In recent times, structures made of cinder blocks, concrete and tarpaper are appearing. Each camp is responsible for obtaining its water, fuel and other essentials, most of which must be hauled in over long distances. Most camps do not have electricity, running water, modern sanitation, and none have telephones. Wood used for heating and cooking is scarce and must be brought in from the mountain areas. Roads are unpaved, badly rutted, unmarked, and often impassible in winter. Many families own a pick-up truck which serves for hauling supplies and for family transportation. A recent study by the University of New Mexico showed that the proportion of the average Navajo family budget going into transportation is two and one-half times larger than that allocated by non-Navajo families. A second survey showed that 20% of the families do not have access to vehicular transportation.

The Navajo are a pastoral people raising sheep for food and wool. After spring shearing the women clean, wash, card, and dye the wool and weave it into rugs and blankets. These are sold at a trading post or "in town"--Cuba, Albuquerque, or elsewhere. A woman, working from a design that exists only in

her mind, may spend up to six months weaving a single rug. For this it is estimated that she may earn as little as $1.30 an hour. Many of the younger women are not learning the skill and the art is slowly vanishing.

Both men and women make jewelry from silver and turquoise--a craft taught them by the Spanish. The popularity of Indian jewelry in recent years increased the market substantially. To meet this demand assembly-line production by entreprenuers in Albuquerque and Gallop have contributed to an oversupply of jewelry.

Traditional healers, such as the medicine man and folk diagnostician, are widely used. Some families use both traditional and modern modes of healing. Many do not seek health care until illness greatly interferes with daily activities. Preventive health care is not widely understood or practiced in the area.

Cultural and language barriers seriously affect the ability of Navajos to secure jobs and adjust to "nine to five" routines. English as a second language is usually not learned until the Navajo child goes to school. Most families live well below the poverty level and have an estimated average family income of $1,500 a year, about $300 per person.

The Navajo diet may provide "borderline" amounts of several nutrients according to a survey by the University of Pittsburgh[4] and by Darby[5]. Lack of refrigeration and lack of variety in foods offered by the trading posts and

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[4]Rogers, K. and Reisinger, K., "Nutrition Survey of the Lower Greasewood Chapter, Navajo Tribe, 1968-69." Report from the Dept. of Community Medicine, University of Pittsburg, School of Medicine, 1969.

[5]Darby, W. J., Salsbury, G. G., McGarity, W. J., Johnson, H.F., Bridgforth, E.B., and Sardstead, H. R., "A Study of Dietary Background and Nutrition of the Navajo Indian, "Journal of Nutrition, 60 (Suppl.2) 3-85, 1956.

village grocery stores limit the diet as does the high cost of food. Mutton stew with fried bread, and beans, tortillas, and hot chili are typical foods. Soda pop often takes the place of milk since it does not need refrigeration. The availability of free canned formula means that many infants are bottle-fed and often do not start solid foods until they are a year old or older.

The Spanish: The Spanish conquistadores came to the Southwest in the 1500's in search of gold. Shortly afterwards the Spanish settlers and priests established villages with schools and churches in northern New Mexico and southern Colorado. The isolation of these villages helped preserve the Hispanic culture, language and style of life. Today the descendants of these early settlers remain patriarchal and emphasize close family and kinship ties. Many families in a village have the same family name, and in some instances the villages bear the same name. Relationships among families and villages may be hostile; outsiders are often looked upon as unwelcome intruders. Some families occupy adobe homes constructed by ancestors several generations back; however, trailer homes are now used by younger families who can afford them.

The Spanish, in contrast to the Navajo, are more given to agriculture. Although an altitude of 7,000 feet or more means a short growing season, most families have gardens and some operate small farms. A few head of livestock are kept and some families ranch on a larger scale. Some seasonal jobs such as forestry activities are available. Lack of employment opportunities, however, is a problem for the Spanish as well as the Navajo.

The Anglo: The few Anglos living in the Checkerboard are primarily employed by two major natural gas companies in the area, teach in the schools, or work for the Checkerboard Area Health System. A sprinkling of the Anglos are self-employed in various small business enterprises. Those working for the

gas companies live in company housing which, collectively, are also called "camps". Anglos, particularly health and other professional persons, tend not to come and stay. Those who come to serve in the schools and the CAHS have a high turnover. Anglos, especially those with young children, tend to remain for several years and then move on to places with more opportunities.

The Schools

Schools in the area also form a checkered pattern (See Map 2). The Bureau of Indian Affairs operates two boarding schools and one day school. Three boarding schools are sponsored by various protestant church missions, and six Headstart preschool programs are operated by the Navajo Office of Equal Opportunity (NOEO). The Catholic church has an elementary/junior high school, and one village has its own two-teacher school. Finally, there are eight public schools in the Jemez Mountain and the Cuba school districts. The size of these schools range from 100 to 300 students. The six NOEO Headstart programs have an enrollment of just over 100 or an average of 17 pupils per program. The sparse settlement pattern and great distances require that many children leave home early and return late after many miles on a school bus, or leave their homes to live in boarding schools. These same factors pose problems in the delivery of health services in the area.

The Health System

Prior to 1971 there was nothing in the Checkerboard which could be referred to in any formal sense as a health care system. In that year, the Presbyterian Medical Services of Santa Fe, a nonprofit corporation organized in 1965, received funds from the Social and Rehabilitation Service of the Department of Health, Education, and Welfare to test the effectiveness of a model health care system in a distressed rural area. The Checkerboard was chosen as the site for the project. Further development and improvements of the system resulted in the

continuation of funds from various sources such as the Indian Health Service, Health to Underserved Rural Areas, the Women, Infant and Children's Program, the New Mexico State Health Agency, the Robert Wood Johnson Foundation, and the Sandoval County Economic Opportunities Corporation.

The Checkerboard Area Health System provides outreach, transportation, health maintenance, limited outpatient diagnosis and treatment, and limited emergency and inpatient services at its Health Center in Cuba. Public health services such as well-child clinics, family planning, communicable disease control, and immunization services are an integral part of the CAHS program. Innovative aspects of the CAH System includes a series of satellite clinics and use of physician extenders. The system of satellite clinics is designed to bring basic services as close to the people as possible. (See Map 3 for location of clinics.) Each of the six satellite clinics provides almost identical services. Each has a waiting area, an office and a radio communication room, an examination room, laboratory, pharmacy, and medical records areas. Most of the clinics are equipped with a dental chair and dental "set up". Each clinic has radio equipped vehicles for home visits and staff and patient transportation. All the clinics are under the supervision of a certified and licensed nurse practitioner or physician assistant. The clinics are staffed with community aides trained to assist in the clinics, to make home visits, to perform simple laboratory procedures, to dispense prepackaged drugs, and to counsel and educate patients. A radio and medical record systems allow a free flow of information between the satellite clinics and the CAHS Health Center in Cuba. Telephone or radio contact can be made with a physician in Cuba and a physician visits the clinic each week to review patient charts and to see difficult cases.

The Health Center at Cuba has a ten-bed inpatient unit, including a maternity ward, a 24-hour emergency service, a pharmacy, a laboratory, an x-ray

unit, and a central radio communications room. The Center has two ambulances and other vehicles which are radio equipped. Patients requiring services too complex for the Center are referred to the medical centers in Albuquerque, Gallop or Shiprock.

The Demonstration

The program was funded in June, 1973 by a demonstration grant from the Social and Rehabilitation Service to the Presbyterian Medical Services. At the time, medical screening (non-EPSDT) of children in the Checkerboard schools was conducted by the CAHS. Thus, the project was funded only for developmental screening. As will be discussed later, the first year's experience indicated a need for an integrated medical and developmental program. Thus, the grant was modified to provide both kinds of screening in one effort under the project coordinator who reported directly to PMS. Funds were made available to cover costs of diagnosis and treatment of those children referred to CAHS on the basis of medical screening findings.

The overall goal of the demonstration was to develop a model program for the delivery of medical and developmental screening, diagnosis and treatment services to children in a rural area. The aim was to develop an economically practical program that could be replicated, in part or whole, in other areas especially those with rural characteristics. Proposed features included screening in schools,[6] and the use of indigenous paraprofessionals for medical and developmental screening. A feature added later was use of evaluation findings to modify the management and operation of the program as outcomes seemed to indicate.

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[6]By virtue of its waiver, the project screened all children with parental consent regardless of their Medicaid eligibility. This feature of the program cannot, of course, be replicated by the states, given the present status of the EPSDT legislation.

EPSDT National Guidelines

For those readers not familiar with EPSDT and the concern of Congress which resulted in its establishment, the following excerpt from the 1972 Guidelines[7] will be helpful.

> The 1967 amendments to Title XIX of the Social Security Act added a requirement to Medicaid that was intended to direct attention to the importance of preventive health and early detection and treatment of disease in children eligible for medical assistance. This corresponded to a similar amendment to Title V of the Act. Through this amendment Congress intended to require States to take aggressive steps to screen, diagnose and treat children with health problems. Congress was concerned about the variations from State to State in the rates of children treated for handicapping conditions and health problems that could lead to chronic illness and disability. Senate and House Committee reports emphasized the need for extending outreach efforts to create awareness of existing health care services, to stimulate the use of these services, and to make services available so that young people can receive medical care before health problems become chronic and irreversible damage occurs.

In these guidelines screening, diagnosis, and treatment are defined as follows:

1. Screening is the use of quick, simple procedures carried out among large groups of people to sort out apparently well persons from those who have a disease or abnormality and to identify those in need of more definitive study of their physical or mental problems.

2. Diagnosis is the determination of the nature or cause of physical or mental disease or abnormality through the combined use of health history, physical, developmental and psychological examination, and laboratory tests and X-rays. Although, in some instances, a presumptive diagnosis may be made at the time of screening, it will usually be necessary to refer the patient to the appropriate practitioner or medical facility for definitive evaluation.

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[7]Medicaid: Early and Periodic Screening Diagnosis, and Treatment for Individuals Under 21; Program Regulation Guidelines. DHEW, Social and Rehabilitation Service, Medical Services Administration, Washington, D.C., June 28, 1972.

3. Treatment means physician's or dentist's services, optometrist's or audiologist's services, hospital services (inpatient and outpatient), clinic services (both comprehensive health services centers and specialized clinics). laboratory and X-ray services; prescribed drugs, eyeglasses, hearing aids, prosthetic and orthotic devices; physical therapy, occupational therapy, speech pathology and audiology services; rehabilitative services; and any other type of medical care and services recognized under State law, to prevent, correct or ameliorate disease or abnormalities detected by screening and diagnostic procedures.

4. Early means, in case of a family already receiving assistance, as early as possible in the child's life; or as soon as a family's eligibility for assistance has been established.

5. Periodic means at intervals established for screening by medical, dental and other health care experts at appropriate periods of time to assure that disease or disability is not incipient or present. Some procedures should be done annually, some every two or more years, and the frequency of others will depend on the child's age. Health experts in the State should be consulted for assistance in establishing periodicity.

Project Goals

The program was designed with special attention to the geographic, economic, ethnic, and linguistic characteristics of the Checkerboard Area and its people. The plan for its implementation included the following goals in keeping with national guidelines. These goals remained constant throughout the duration of the program. Short range objectives were specified and modified as seemed appropriate to further the long-term aims of the project.

1. Identify individuals with potential or apparent physical or mental health and developmental problems requiring diagnosis and, possibly, treatment.

2. Develop and test quick and facile screening procedures to detect children with actual or potential developmental problems, including non-verbal tests designed for Navajo and verbal tests designed for Navajo and Spanish speaking people.

3. Determine developmental test norms for the indigenous population.

4. Develop a training program for indigenous paraprofessionals, parents, and volunteers as resources to conduct screening and assist in treatment.

5. Provide a mobile program with itinerate services and capacities in order to overcome the geographical distances by doing screening, diagnosis and treatment in the child's home community.

6. Determine the level of need and the kinds of services appropriate to meet those needs with the limited human and support resources available.

7. Develop agreements and referrals for service with the schools, university, welfare department, Crippled Children's Services, Vocational Rehabilitation, and other appropriate agencies and serve as facilitator between these agencies and families.

8. Evaluate the program to determine the results of the various screening methods developed, the use of the paraprofessionals, and of the future needs for screening and the costs per child. The evaluation will carefully analyze the differential needs and responses of the three cultures. It will determine if the program has been of positive value in helping individuals with mental and/or physical problems.

9. Provide a central location for the dispersal of services, information and health education for children and their parents.

10. Provide a model of centralized multidisciplinary comprehensive services for the children that can be utilized by other rural areas.

11. Collect data which can be used in refining, or in developing additional screening instruments which are based on the performance of the children of local cultures, with applicability to other minority groups.

Operational Implementation

To approach these objectives under the conditions posed by the Checkerboard

required special effort. Review of the conditions and habits of the population indicated that the traditional appointment system had to be discarded. Rapid communication with families scattered over great distances was not possible since only a few in the villages had telephones. Without door-to-door mail delivery, many families may wait for weeks before picking up their mail. Moreover, the problem was complicated by the presence of three concepts about time captured in the saying, "Anglos refer to their watches as running, the Spanish say that their clocks are walking, and the Navajo have no time-pieces at all." In scheduling meetings one often hears the quip: "Is that Navajo or Anglo time?"

In review of what took place over the three years of the project six characteristics emerge as having been essential in the organization and operation of the project. These are: mobility, coordination, use of indigenous para-professionals, cultural sensitivity, comprehensiveness, and flexibility.

Mobility: To carry out the screening, mobility of the staff as a team was essential. In the early months of the project, the personal cars of the staff were used for transportation. This temporary and unsatisfactory arrangement changed in the spring of 1974 with the purchase of a second-hand van-type vehicle. Another van was added in 1975 and a third vehicle, a used pick-up truck, was added later. Keeping the vehicles in good working order remained a problem throughout the life of the project because of the extreme wear and tear from extensive travel over unmaintained roads. A schedule for daily and weekly maintenance was developed and this responsibility assigned to one person. All staff members were briefed on tire

changing and simple trouble-shooting techniques in the event of breakdown on isolated roads. Both the vans used by the screening teams were equipped with radios, which provided a communication link with the CAHS clinics.

Coordination: The Checkerboard, like many isolated rural areas, lacks many county resources and services and has duplicates of others. In order to move toward the achievement of its goal and to avoid the all too frequent outcome of children receiving no attention beyond screening, the project spent much energy in coordinating its efforts with the schools, the Checkerboard Area Health Care System, and other resources in the area for approaching comprehensive attention for those children found to be in need.

Comprehensiveness: The third feature, closely related to the second, was the attempt to see each child in a comprehensive fashion to avoid fragmentation. This effort took focus in case management procedures which stressed the following of children from screening through diagnosis and treatment and, at times, involving families in home care. This approach was further reinforced by the fact that the same people doing the screening also did the follow-up. This procedure gave not only continuity of care for the child and family, but also had the marked advantage of providing greater personal satisfaction for the staff. Additional emphasis on comprehensiveness occurred in the third year of the project when the feedback to schools and teachers integrated the information on medical and developmental screening results.

Extension of Paraprofessional Roles and Cultural Sensitivity: These fourth and fifth features of the project are closely related. From the outset the project set about recruiting and training indigenous staff

to carry out screening functions often done by more highly trained persons. In the recruitment, persons were sought who spoke either Navajo or Spanish, as well as English, who had not rejected their own cultural heritage, who were comfortably aware of psychocultural and value differences, and who had a personal commitment to help others.

This bilingual staff was first trained to conduct developmental screening and, later, to take part in the medical screening. The training was under the direction of the nurse practitioner and the staff psychologist. Several trainees had not completed high school; however, effort was made to allow job mobility by permitting persons, on the basis of training, to move from screening aide to the position of assistant technician or technician. For example, arrangements were made through the Indian Health Service for three aides to obtain training in audiometry through the University of New Mexico, which made possible their certification as audiometric technicians.[8]

Flexibility: The final and most important feature of the work was the development of a flexible stance in the planning and implementation of such a program in an environment where life styles, concepts of time, and notions about how the pace of life should proceed do not fully fit the urban mode. Under these conditions, persons given to rigid, preconceived planning and scheduling of work are at high risk for frustration. It quickly becomes evident that flexibility in planning, setting policies, and procedures was a must, as well as willingness to modify these in the light of ongoing experience and feedback from the evaluation.

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[8]One indigenous staff member, a licensed practical nurse, received a scholarship and left the project to enter training to become a physician's assistant.

Organization and Staffing

At the peak of the project's operation, the staff included persons in the following positions:

Program coordinator
Consultant (2) - part-time medical and psychological
Pediatric nurse practitioner
Secretary
Data records technician
Staff psychologist (diagnostician)
Remediation specialist
Registered nurse
Licensed practical nurse
Screening technician (medical)
Screening assistant (developmental)
Screening aides (2)
Housekeeper/maintenance person

The organization of the staff is depicted in the following chart (Figure 1). The chart is accurate to the extent to which it suggests that roles were clearly defined by job descriptions. It does not, however, give a full sense of the staff's enthusiasm and commitment[9] to the project, the level and quality of communication within the staff, and the extent to which these characteristics created and sustained staff solidarity and work effectiveness.

In the third year of the project, medical and developmental screening were conducted on alternate weeks in a given school. For medical screening, the

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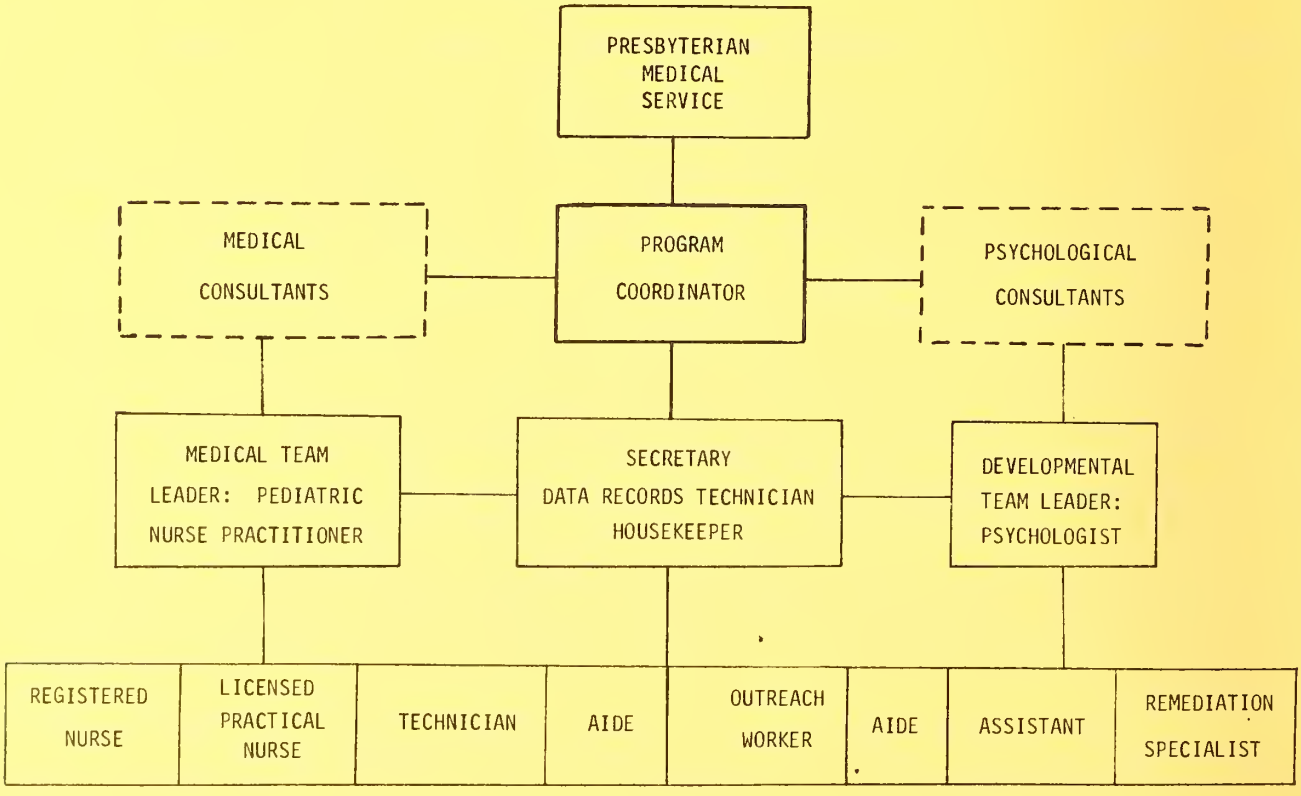
[9]In the fall of the third year of the project, 13 of the 15 members of the the staff completed a questionnaire exploring attitudes about work. The instrument dealt with five factors: work, supervision, co-workers, pay, and promotion. Each of these areas was ranked by each staff member as to its importance, and each staff member completed the Job Description Index (JDI) developed by Smith (vide supra). On both measures, work and work supervision were most highly ranked in that order. Since all but one of the staff completing the forms were female, the mean scores were compared with norms provided by Smith for women. In every instance the means of the staff were higher than the norms. Not surprisingly, and like the norm subjects, pay and promotion received the least positive evaluation.

P.K. Smith, L.M. Kendall, and C.L. Halin. The Measurement of Satisfaction in Work and Retirement. (Chicago: Rand McNally and Company, 1969).

pediatric nurse practitioner served as the team leader, and when organized for developmental screening, the staff psychologist served as team leader. Previously, children were screened in several schools before results were given to teachers and parents and before follow-up for diagnosis and treatment was initiated. An effective solution was reached in the third by allocating three weeks to each school: the first week was used for medical screening, the second for developmental screening, and the third was used to provide feedback to the schools and parents and to initiate follow-up activities. This approach worked well in that it spaced the workload rather evenly over the school year. And, by separating medical and developmental screening, the anxiety generated in some children by some screening procedures did not interfere with developmental screening.

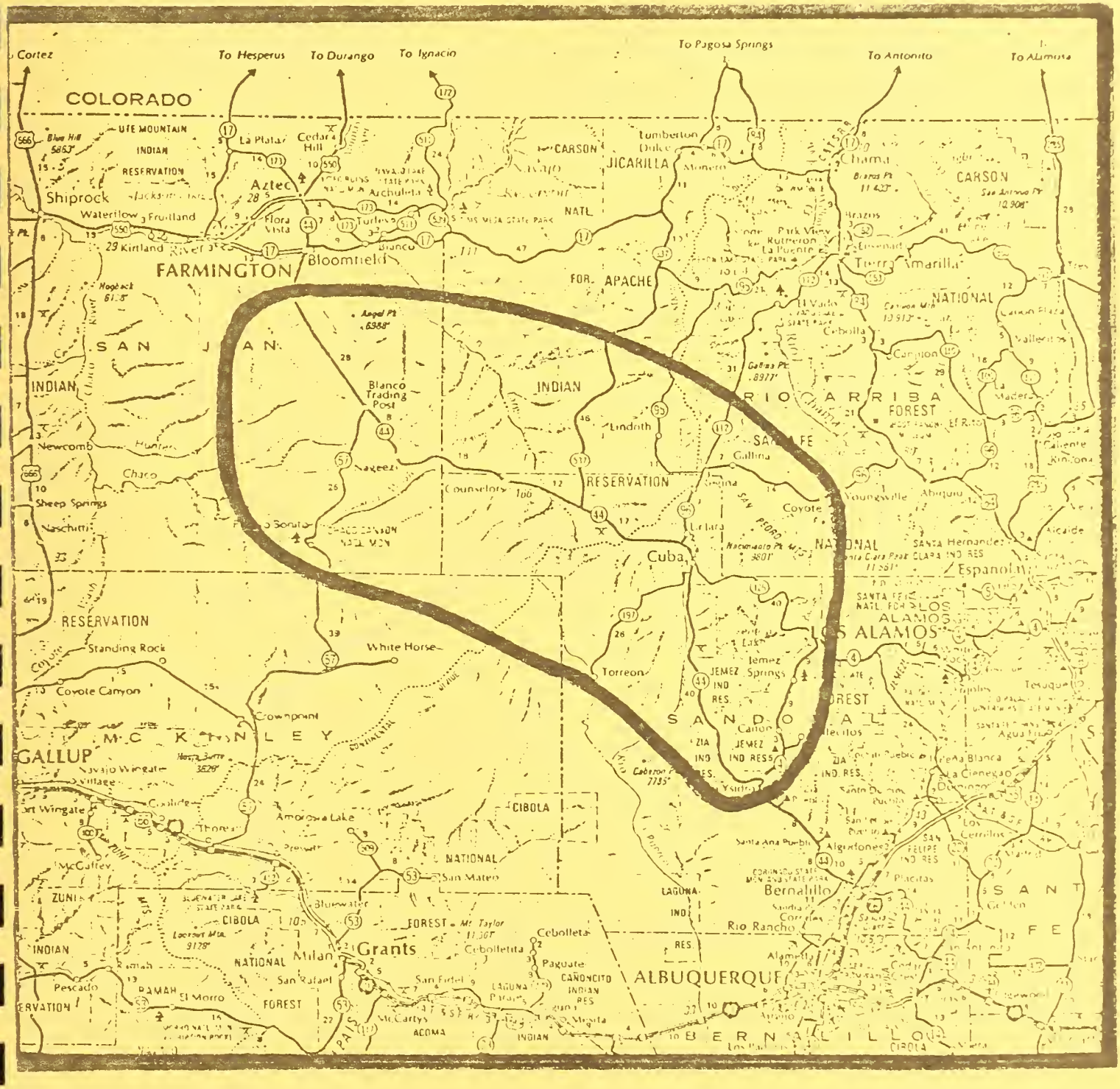
FIGURE 1

Project Organizational Chart

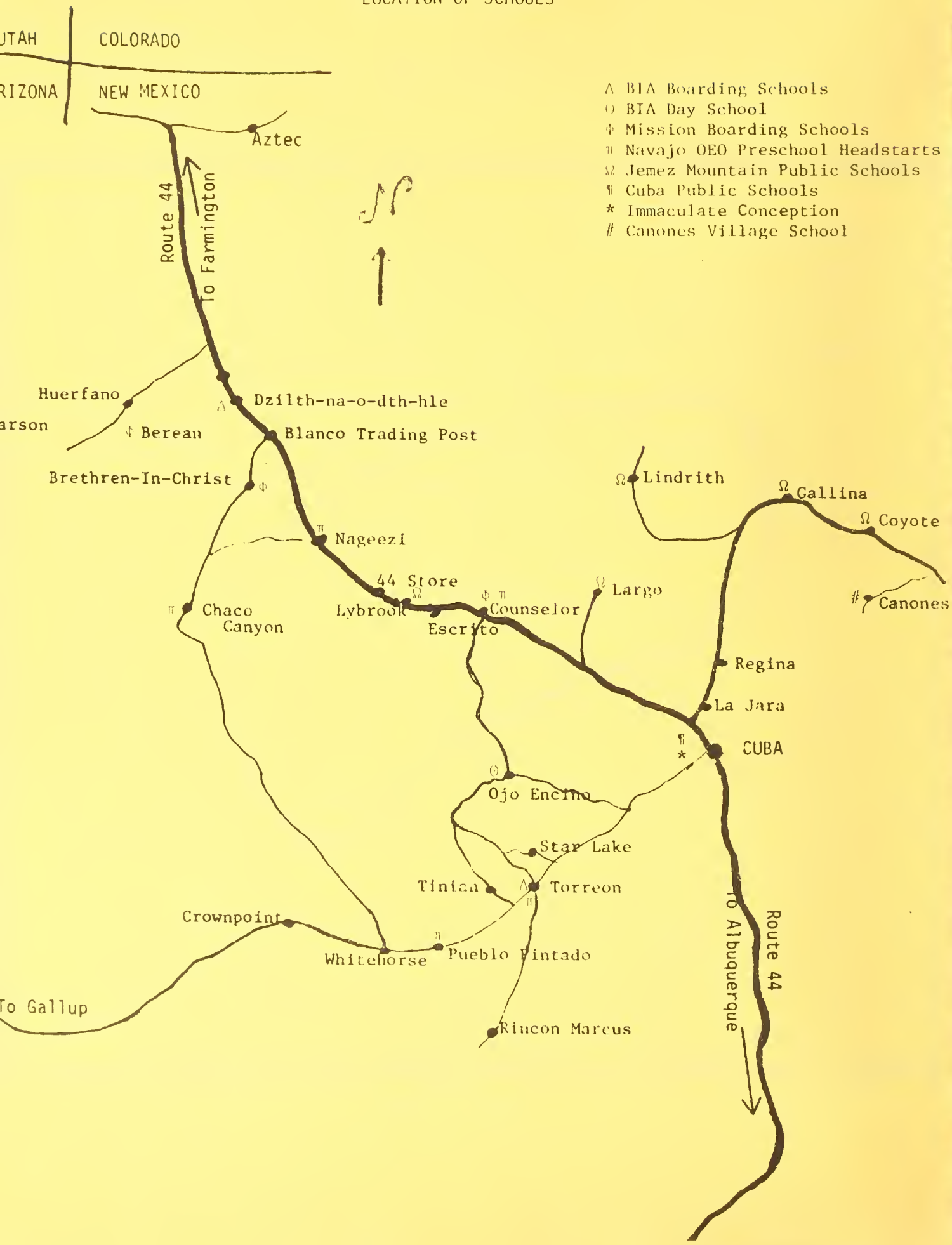


Map 1

THE CHECKERBOARD AREA

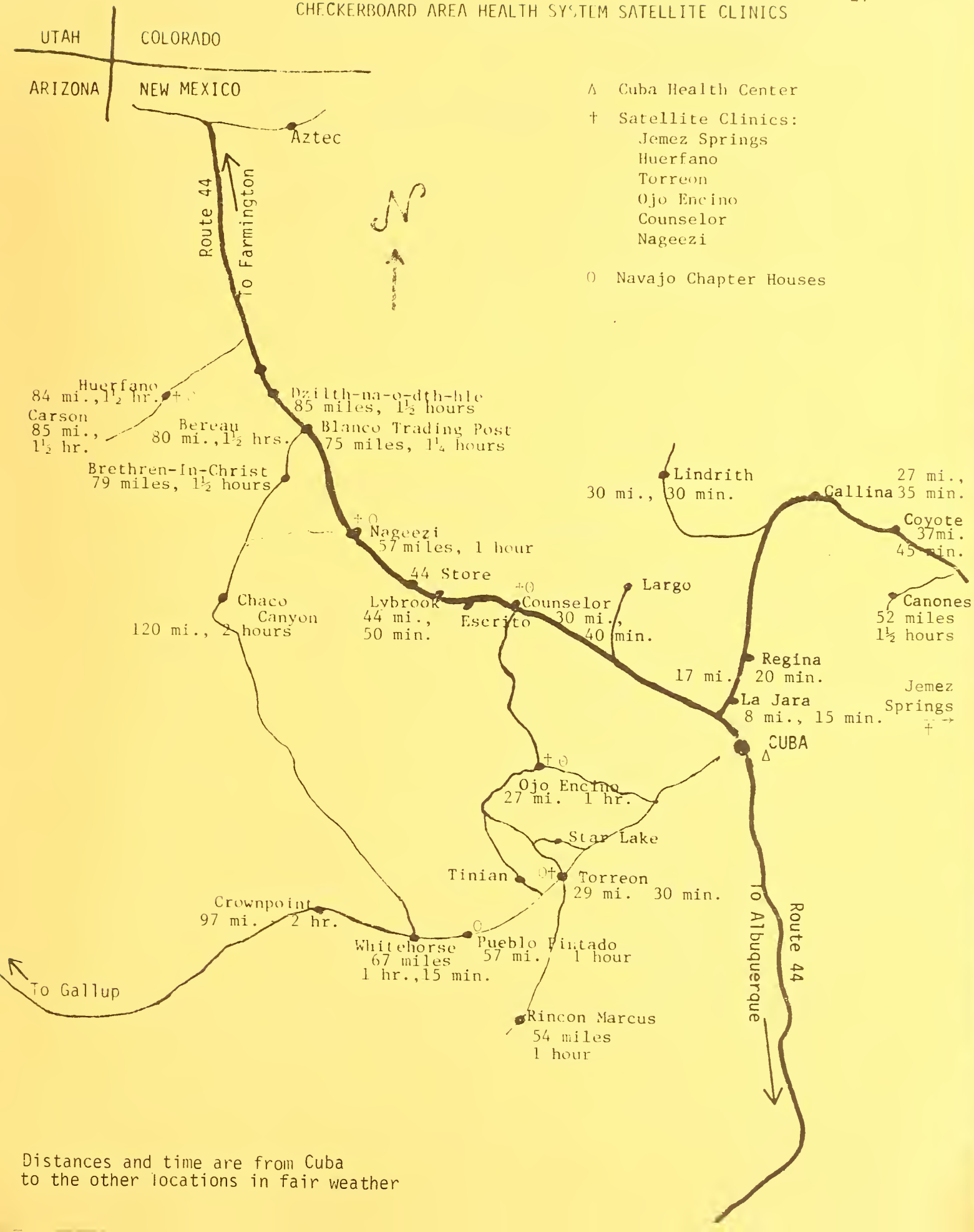


Map 2
THE CHECKERBOARD CATCHMENT AREA
LOCATION OF SCHOOLS



Map 3

CHECKERBOARD AREA HEALTH SYSTEM SATELLITE CLINICS



Distances and time are from Cuba to the other locations in fair weather

CHAPTER TWO

DEVELOPMENTAL SCREENING: ORGANIZATION, DIAGNOSTICS, AND TREATMENT

This chapter deals with three aspects of the project's developmental screening, diagnosis and treatment activities. The first section of the chapter discusses the foci of the screening, the tests used, staff training, and outlines the screening and the feedback process to the schools. Sections two and three describe the diagnostic and therapeutic interventions done by the project. The chapter which follows gives the major outcomes of the developmental screening.

The Organization and Process of Developmental Screening

At the outset the project was faced with a number of practical questions with respect to the developmental screening. For example: On what dimensions of development should the focus be placed? What instruments are available for the job? Which of those available should be used? Are there norms that can be reasonably applied to the children representing three different cultural and linguistic traditions? How can culture fairness be assured in the testing instruments and test procedures? Is it possible to put together a screening battery to meet these requirements that can be administered in 20 minutes or so? Finally, can persons with high school education representing the three ethnic groups be adequately trained to conduct the screening?

The developmental screening proceeded on the assumption that it was a first step in a preventive process. It was made clear to teachers and

others that the testing was not to determine the level of academic achievement, but rather to identify, as accurately as possible, the developmental strengths and weaknesses of the children screened. Children low on the screening measures were viewed as potentially at risk. Teachers of such children were to be alerted to the special "needs" of each child and given assistance by the project staff in addressing these needs. Care was taken to avoid implications that the screening was diagnostic or that it provided etiological explanation of the problems found. It was also recognized that what might appear as a developmental "lag" for a given child at a given time might simply be unique to him/her and be "outgrown". For this reason, a rescreen within one year was deemed advisable.

The Screening Foci

After consideration by the project staff and its psychological consultants, four developmental dimensions were decided upon as most appropriate for screening. These were: (1) intellectual functioning; (2) English language facility; (3) visual-motor perception; and (4) emotional adjustment. It should be noted that knowledge and use of English as a language is not as clearly a matter of development as the other three dimensions; however, English is the predominant language of instruction in all schools in the Checkerboard area, and the language which the Checkerboard people must be able to use in dealing with the larger society and its representatives. Thus, the social, intellectual and emotional growth of non-English speaking children in this environment is not easily separated from their skill in using English.

Tests Used in Screening

It would have been, from one perspective, highly desirable to have

explored[1] the use of many tests or perhaps to have developed one or more special screening instruments for use with the children of the Checkerboard. Since the EPSDT project was neither designed nor funded for such activities, it was necessary to choose from available instruments those in which the project's consultants had most confidence. The instruments chosen are widely known and require little more identification that noting their names. Whatever inherent weaknesses these tests have are part of the results obtained by their use; other factors which may influence the results may have entered via testing procedures, scoring and interpretation.

The four developmental dimensions for which screening was done and the tests used over the three years are outlined in Figure 2.1. These were as follows:

Intellectual Functioning: (See Figure 2.2.) For kindergarten, pre-school, and grades one and two, the information subtests of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) and the Wechsler Intelligence Scale for Children (WISC) were used in the first year (1973-74) of screening, along with the Human Figure Drawing test (HFD). Use of the HFD continued for the second and third years of screening. The information subtests of the WPPSI and WISC were not used after the first year. The results, given later in this report, suggested a cultural bias in this subtest. The Wechsler Block Design and Picture Completion subtests were used in the second year, but only the Block Design was used in the third year. For children in grade three and those few in grades four and five who were screened, only the

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[1] During the first year of developmental screening, sociograms were constructed for each classroom by asking each child to name other children in the class whom they would like best to play with, work with on a class project, etc. The sociograms proved useful for identifying children with possible interpersonal problems; however, as the volume of screening increased in the second year, it was necessary to omit the sociograms.

Draw-a-Person test was used during all three years of the screening. In the second year, the Picture Completion and Block Design subtests of the Wechsler Intelligence Scale for Children, Revised (WISC-R) were used. In the third year, the Picture Completion subtest was not used.

Visual-Motor Perception: The Bender-Gestalt test was used for assessing visual-motor perception for children of all ages over all three years of screening and was scored according to the Koppitz developmental scoring system.

English Language Knowledge: For children in grades two and under, the age-appropriate Wechsler Vocabulary subtest was used. Older children were screened by use of the Wide Range Achievement Test (WRAT) and the vocabulary subtest of the WISC.

Emotional Adjustment: The assessment of emotional adjustment of all children for all three years of the screening was done by use of the Bender and the Human Figure Drawing tests. For the latter, 30 indicators were employed. For the Bender, four Koppitz indicators were used for the first year of screening; in years two and three, the number of indicators was increased to 10.

The time required to administer the full screening battery, as outlined above, ranged from 15 to 30 minutes. At each screening occasion, the screening team took pains to assure the best testing conditions possible for the children. Careful attention was given to reducing distractions, noises, interruptions, and so on. How well this was accomplished varied widely from school to school.

Other Developmental Screening: In addition to the screening carried out by the EPSDT project, some screening in speech and language was conducted on a sample of the Navajo children in Headstart through the second grade, attending five schools in the area. This screening was done by a team of

speech pathologists from the University of New Mexico Communicative Disorders Unit.[2] Tests and screening included Form B of the Peabody Picture Vocabulary test, an articulation test of the adequacy of a child's speech productions, a bilingual syntax measure to determine levels of oral proficiency in use of English as a second language, a Visual-Motor integration, and a cursory "oral-peripheral" examination to assess the structural and functional adequacy of face, lips, nose, outer ears, tongue, etc., with respect to speech production. The results of this screening are given in the chapter on developmental findings.

Staff Training for Developmental Screening

The paraprofessional staff was composed of residents of the Checkerboard community. Thus, much of the work of the project was carried out by persons who knew the area, the culture and language of the people, and who knew many of the families of the children served. This staff received intensive training over some 150 hours in preparation for the developmental screening. The training, conducted by the psychological consultant and the staff psychoeducational diagnostician, focused on the use of the various tests for each of the four developmental areas. The instruction emphasized the actual administration of the tests and careful review of each staff member's performance, with particular attention to standardization in administering the tests. In addition to this training, the staff was instructed in making home visits to obtain developmental histories, to obtain permission from parents for screening of their children, and to reassure parents that screening

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[2]This screening was done at the request of the EPSDT project directors. Persons from the University of New Mexico involved in the screening included: M. Miles, J. T. Lybolt, Ph.D.; W. E. Fisher, Ph.D.; R. Powers; B. Watrous; and L. Evans.

findings were a matter of confidence and were to be used for the benefit of their children.

The value of indigenous workers may be illustrated by one brief account of a Navajo child badly in need of medical care, as well as attention for developmental problems. The family refused permission for the needed treatment. Previously the father had refused to speak to CAHS clinic staff and, on one occasion, physically evicted a staff member from his home. A Navajo screening aide then visited this home and gained the cooperation of the father--and the child entered treatment.

Overview of the Screening Process

The screening process generally consisted of three phases: pre-screening, screening, and post-screening.

The Pre-Screening Phase: The first phase included contact with personnel of the schools to gain cooperation and participation and to explain the program. Detailed explanations were made to school administrators and teachers regarding EPSDT, the purpose of the screening, the necessity of parental permission for screening,[3] feedback to the schools and to teachers, and the need to avoid negative labeling of children on the basis of screening findings. In describing the program, the fact that it provided both medical screening and developmental (not achievement) assessment was emphasized to encourage a comprehensive (whole child) approach to the children. Also, in the first phase, dates for screening were agreed upon, children to be screened were identified, and dates for feedback sessions set.

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[3]Children were not screened without written parental permission.

The Screening Phase: In the first two years, the scheduling of medical and developmental screening was not closely integrated. As a consequence, children were screened in several schools before feedback could be given, and before follow-up for diagnosis and treatment was done. This tended to dissipate staff time and effort. In the final year, as explained in Chapter One, three weeks were allocated for work in each school: one week for medical screening, one for developmental screening, and one for feedback to teachers and school administrators.

When the screening team arrived at a school, care was taken to interfere as little as possible with the school's normal activity. Usually, three to four staff members were testing simultaneously. Each child was tested separately, which required 25 to 30 minutes. Younger children were always tested first. In the second and third years, the plan was to retest only those children who had done poorly on the screen in the previous year. Teachers could request rescreens if their experience with a given child indicated that he needed help or if a teacher's assessment of a child differed greatly from the screening findings. Teachers could also request diagnostic examinations (to be discussed later) if the performance of a child indicated more intensive attention was needed.

The Post-Screening Phase; This phase of the work involved three primary activities: (1) scoring and organizing the test results, (2) providing feedback to teachers, and (3) follow-up to assure receipt of indicated diagnostic treatment or remedial attention. Feedback to the schools on the medical and developmental screening was done at the same time by the pediatric nurse practitioner and the psychoeducational diagnostician.

The Feedback Process

In isolated rural areas, such as the Checkerboard, a child's primary link to the larger society and its educational and health resources may be his school, and most specifically, his teacher(s). This fact was often demonstrated during the experience of the project and what took place as a consequence of the screening. The child most likely to receive help was the one who had a teacher who understood the concepts of and was receptive to the screening program, and who was motivated to help. This help came about by special classroom effort and individual attention on the part of teachers or by teachers calling on resources outside the schools. Observations of these sorts of activities on the part of some teachers during the course of the project, particularly during the feedback and follow-up process, called attention to the critical nature of the role of teachers and their receptivity and response to the screening program.

It became clear that teacher receptivity was a product of several factors. First, and by no means least, among these was the performance of the EPSDT staff in establishing and maintaining rapport with the schools, their administrators, and teachers. Elements of the rapport involved how well the program was described, the manner and quality of the feedback given, the prompt and efficient following up of problems identified by screening, the providing of assistance promised a teacher or school, the ability of the staff to suggest or provide specific remedial approaches for individuals or groups of students, and the extent to which a good relationship encouraged teachers to call upon the EPSDT staff for help on problems identified by screening.

Developmental Diagnostics

Diagnostic testing was carried out over the three years for 217 children with all but 17 of these being done in the first two years. The chief obstacle in carrying out this part of the developmental program was a shortage of professional manpower. For the first two years the problem was solved by the use of graduate students from the University of New Mexico who were competent in diagnostic testing. Changes in University faculty in the third year interrupted this arrangement, and diagnostic evaluations were done only on those children who were referred as being in special need.

Diagnostic work-ups were done for those children low in three or four of the four developmental areas or upon referral of a child by a teacher, by parents, or by medical personnel. The entire process, including testing, scoring, interpreting the results, and writing a report, took some 14 hours for each child diagnosed. Medical findings, including neurological examinations, often supplemented the reports. Any relevant observations of classroom behavior on a given child were also included. As time permitted, home visits were made in order to obtain a more comprehensive view of the children being evaluated. The aim of the diagnostic work-up was to assess the child's strengths and weaknesses, to give teachers or parents better understanding of the child, and to provide suggestions for helping him in school and/or at home. The report emphasized positive actions that could be taken to help this child. In the report and in discussing a child with teachers or parents, labeling was avoided, e.g., a child was never referred to as retarded or as having a learning disability.

The diagnostic battery consisted of the following tests: The Wechsler Preschool and Primary Scale of Intelligence, Wechsler Intelligence Scale for Children, Draw-a-Person, Bender Gestalt Visual-Motor Test, Harris Test for Lateral Dominance, Wepman Auditory Discrimination Test, and the Wide Range Achievement Test. The tests given a particular child were based on the judgement of the diagnostician who, on occasion, would use tests other than those listed. In all, 1110 tests were administered for an average of 5.1 tests per child evaluated.

Of the 217 children evaluated diagnostically, 61% were Spanish, 32% Navajo, and 7% Anglo. Thus, the Spanish children, when compared to the total screened, were over-represented by two to one, the Navajo were under-represented by one-half, as were the Anglos. By sex, 78% of the 14 Anglos were boys, as were 66% of the Spanish children, and 5.5% of the Navajo. There was no objective evidence to explain these ethnic differences among the children referred for diagnosis. The Spanish children reportedly were more active, outgoing, and vocal than the Navajo children. Such views by teachers often result in referrals or some other action by teachers. Many of the Spanish children also lived in or near the project's headquarters and thus, awareness of and access to the project on the part of teachers and parents may have resulted in a greater referral frequency.

To give results of the diagnostic evaluation would require details far too excessive for this report. It perhaps should be noted, however, that the WISC scores on the Block Design, Picture Completion, Vocabulary, and Information subtests for Navajo and Anglo children evaluated diagnostically

were below the averages obtained in screening. The Spanish children, on the other hand, with few exceptions did as well or better on these subtests as those taking the tests as part of the screening battery. This may have resulted from the referral pattern mentioned above. Interpretations of Wechsler tests used in diagnostic evaluations relied upon performance and verbal scores of bilingual children rather than upon full-scale scores.

Developmental Interventions

One objective of the project called for a mobile program which, in addition to providing screening, would provide "treatment in the child's home community". Precisely what interventions were to be made was not specified, and, moreover, in view of the nature of the "community" and the needs which emerged, funding for such services was far from adequate. In spite of many difficulties and the lack of resources and adequate numbers of professional personnel, the project carried out a number of treatment activities. These efforts were carried out in the schools, in homes, and at the project headquarters in Cuba, called the EPSDT Center.

School Interventions

This feature of the remedial activities has been described earlier. In essence, it involved feedback to teachers following screening and diagnostic evaluation and consultation with school officials, nurses, and parents. The consultations with teachers included suggestions and recommendations for curriculum modification, and ways for working with children identified by the screening as being in need of some remedial attention. At the time of the feedback session, a packet of curriculum enrichment materials was given to

teachers. These included general and specific suggestions for helping children with deficits in the cognitive, visual-motor, language, and emotional areas.

Other methods of assisting teachers included helping in the development of strategies for working with particular children and tailoring remedial activities to individual needs. As time permitted, a remediation specialist and psychoeducational diagnostician would observe and assist in the classroom. Follow-up conferences were via telephone or, time permitting, by visits to schools. When teachers were informed of diagnostic results on a child, his current level of functioning[4] and his principal strengths and weaknesses were also reviewed. An "educational prescription" was usually provided the teacher along with suggested methods and materials for helping the child cope with and overcome his/her difficulty. Remedial education materials from the project's library were also made available to teachers upon request.

These approaches to remedial interventions have far-reaching possibilities. To the extent that teachers adequately pursued the recommended measures in their classrooms and for individual children, most of the children identified as having a developmental lag(s) were exposed to some help. Moreover, such effort on the part of the teachers likely had some positive effect for all of their students. Although the project staff was able to follow up with

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[4]The materials were developed by the project staff and the teachers in the various Checkerboard schools. Persons interested in acquiring these may write Ms. Sally Davis, Director, Department of Pediatrics, University of New Mexico School of Medicine, Albuquerque, New Mexico 87131.

some teachers, it was not possible to make a systematic assessment of the effects of this effort.

Home Interventions

The second sort of intervention took place in the homes (principally in those homes in which a child was referred by its family) for children unable to attend school, or for preschool children with identified developmental problems. In these instances, the staff developed a program for each child, to be carried out by its parents. If other health or welfare needs were present, the staff also sought to remedy those through relevant sources. A number of factors made this approach impracticable. Time, distance, cultural differences, and the inability to communicate quickly by phone or mail created serious and costly obstacles. Moreover, for such a program to be effective, it calls for an order of motivation, interest and comprehension on the part of parents, often not part of the life of the people in such isolated areas.

Other Interventions

Other remedial interventions took place principally in Cuba at the EPSDT Center, as the project's headquarters came to be known. These included a preschool program, summer enrichment program, an "alternate" learning program, a "Tree Project", and speech therapy. A brief description of each of these follows:

The Preschool Program: This was a year-round program which operated four days per week from 9:00 to 11:00 a.m. in a renovated army barracks. The curriculum was adapted from several published preschool curricula to meet, as well as possible, the needs of the children in this community. School

readiness activities included pre-math, logical thinking, beginning reading and writing skills, language development and enrichment, arts and crafts, and fine and gross motor-coordination training. The staff included a special instructor, a Spanish-speaking paraprofessional, a volunteer Spanish-speaking mother with elementary education training, and a teen-age girl who worked as an aide. The schedule was kept flexible in order to adapt to the variations in age and number of children in attendance, to incorporate special opportunities which arose from time to time, and to allow the instructors to follow the activities initiated by the children.

The children enrolled ranged from two to just under six years of age. Attendance varied greatly from day to day; however, the average daily attendance was 21. Most of the children lived in the immediate area and were brought to the school by their parents. Staff members used their own automobiles to bring two extremely isolated children to the school.

Summer Enrichment Programs: Summer programs for children identified as being in need of stimulation and remedial help were provided in three different sites: Torreon, Cuba, and the village of Coyote in the Jemez Mountains. In general, the programs included academic training and attempted to promote social growth and other skills via recreational activities, arts, crafts, music, and nutrition and health education. Attendance, highly dependent on transportation, varied according to the availability of staff cars, the project vehicle, and an old army ambulance provided by the Jemez Mountain School District. The children attended four days per week and received free lunches and a snack through the New Mexico School Lunch Program. The Torreon

Program served Navajo children and reached a maximum enrollment of 95. The Coyote Program had a maximum enrollment of 34, all Spanish speaking. The Cuba Program had an enrollment of 25 and represented all three ethnic groups in the area.

Fridays were reserved at each center for staff training and planning for the following week's work. Consultants representing health, education, psychology, and so on were frequently used in these sessions to provide as much help as possible for the staff. The staffs of the summer programs reflected great variety--school teachers, college and high school students, neighborhood youth corps workers, and teen-aides.

Systematic evaluation of these three programs was not possible. However, the children were eager and cooperative and many of them appeared to profit from the experience. Behavioral and emotional problems were almost non-existent. Parents were cooperative and appreciative.

The Cuba "Tree" Project: This program was a joint venture of the project, the village of Cuba, the Cuba school system, and the district office of the U.S. Forestry Service. Participants in the program were eight adolescents referred to the EPSDT project by the schools and the CAHS. Since most of the participants were "developmentally handicapped", the aim of the program was to provide them with a learning/work experience with some future relevance for them. The principal activity of the program was planting trees and shrubbery to beautify public and private properties. In the latter instances, customers contracted for the services of the group and the students were remunerated for their work. The work of the group was supervised by a local nurseryman. Under his tutelage, the participant not only learned landscaping, reforestation, etc., but also gained experience in the use of the various types of heavy machinery used in

this field. The project has served as a model for larger programs established for Navajo youth in Arizona.

The Alternate Learning Programs: Discussion with school administration of the Cuba Mid-High School indicated that a number of students, particularly among the Navajo, were bright but their school attendance and interest were low. The goals were, in brief, to allow the students to explore new interests and learning opportunities in a selective, as well as random, fashion, to engage them in "active" self-directed interest, to help them use their present knowledge and skills and to help them to gain a sense of self-direction, control, and responsibility.

There were 15 students enrolled in the program over a three month program (March - May, 1976). The group met at the EPSDT Center two hours each afternoon. Arts and crafts came to be the main activity of the program, principally leather, woodwork, macrame, and pottery. Several students were commissioned to make macrame and leather items by persons who saw their products. Some of the products were sold in local stores and the proceeds used for group trips and new materials. They learned to use the telephone and practiced using typewriters. Several students became interested in landscaping and tried their hands at this. Two other students became familiar with the use of tape recorders by helping to translate Navajo into English. The group traveled to Albuquerque where they visited the University and the home of a professor, and toured the airport and shops where they saw Navajo craftsmen at work and Navajo arts and crafts on sale.

Originally the effects of this experience on the students was to be assessed by pre- and post-testing with the Piers-Harris Self Concept Scale and

by having two teachers evaluate the personal and social behavior of each student in the school environment prior to and after the experience. The evaluation aborted for several reasons; principally, some teachers objected to the "subjective" evaluations and invasion of students' privacy. However, in spite of this, the project was judged successful by the school and tentative plans were made to incorporate the course as an elective if funds could be found to continue it.

Speech Therapy: In the summer of 1976, a small speech therapy project was undertaken in cooperation with the Department of Speech, New Mexico State University at Las Cruces. A graduate student from the University spent about two months in the program to fulfill externship requirements for the degree of Master of Arts in Communicative Disorders. There were 20 referrals involving such problems as cleft palates, pre-school language difficulty, dysarthria, etc. Case studies, including treatment objectives and progress, were prepared on 15 of the 20 children. The difficulty in doing something about such conditions in the Checkerboard is reflected in the assessment of the students work by her graduate supervisor.

> This student is doing an adequate job in an overwhelming task. The problem of tri-ethnicity, the constant need for an interpreter, the vast traveling distance, the lack of communication or assessment tools appropriate for Navajo individuals make this extern experience unique and challenging. The aforementioned problems will have to be solved in order for a productive and accountable language pathologist to function effectively in the Cuba Checkerboard Health System.

Conclusion

The proposal for the developmental screening diagnosis and treatment program did not precisely specify what the project was to do and how it was to achieve its objectives. How the project went about developmental screening, diagnosis and treatment has been described along with what it did with respect to diagnostic and remedial services. It might be argued that a more orderly presentation would have first given the screening results, then the diagnostic outcomes, followed by a description of the remedial efforts taken to deal with the problems as revealed by screening and confirmed by the diagnostic element of the program.

Such an orderly progression of events is all too often a happy, soon-to-be-frustrated anticipation or an after-the-fact orderliness imposed by report writers. However, events did not allow things to happen in this fashion for the project: there was an immediate demand for diagnostic attention for some 200 children which, in great part, emerged independent of the screening; secondly, the need for developmental remedial programs did not require screening to identify needs; the response of the community clearly demonstrated these two points. Implicitly, a third fact was also demonstrated: under some conditions, extensive use of psychological instruments for screening and diagnostic evaluation encounters resistance. The fact that no serious resistance to the testings was encountered in the community attests to the effectiveness of the project's general approach and methodology.

Figure 2.1

DEVELOPMENTAL SCREENING INSTRUMENTS
BY SCREENING YEAR AND SCHOOL GRADE

Grades: Kindergarten through Second

Areas Screened	Year One	Year Two	Year Three
Intellectual Functioning	HFD (10 indicators)[1] WPPSI, WISC } Information Subtests[2]	HFD (10 indicators) WPPSI, WISC-R[3] } Picture Completion and Block Design	HFD (10 indicators) MISC-R Block Design
Visual Motor Perception	Bender	Bender	Bender
Language Facility	WPPSI, WISC } Vocabulary Subtests	WPPSI, WISC-R } Vocabulary Subtests	WPPSI, WISC-R } Vocabulary Subtests
Emotional Adjustment	HFD (10 indicators) Bender (4 indicators)	HFD (10 indicators) Bender (10 indicators)	HFD (10 indicators Bender (10 indicators)

Grades: Third through Fifth

Intellectual Functioning	Draw-A-Person[4]	Draw-A-Person WISC-R Picture Completion and Block Design	Draw-A-Person WISC-R Block Design
Visual Motor Perception	Bender	Bender	Bender
Language Facility	WRAT WISC Vocabulary Subtests	WRAT WISC-R Vocabulary Subtests	WRAT WISC-R Vocabulary Subtests
Emotional Adjustment	HFD (30 indicators) Bender (4 indicators)	HFD (30 indicators) Bender (10 indicators)	HFD (30 indicators) Bender (10 indicators)

[1]Smile, good facial, clothing, and hand detail; neck, profile, joints, movements, action.

[2]Used only if the score increased the child's index number above that based on the HFD.

[3]WISC-R became available in the second year of screening.

[4]Scored according to Goodenough: See D.B. Harris, Children's Drawings As A Measure of Intellectual Maturity, (New York: Harcourt, Brace and World, Inc., 1963).

Figure 2.2

INSTRUMENTS EMPLOYED TO ASSESS INTELLECTUAL FUNCTIONING

Instrument	Comments
A. Human Figure Drawing using 10 positive indicators: smile good facial detail good clothing detail good hand detail good proportion neck profile joints movements action	- Used for children in grades kindergarten through second in all three years of screening.
B. Information Subtest from WPPSI or WISC (as age appropriate)	- Used in first year of screening only (1973-1974)
C. Block Design Subtest from WPPSI or WISC (as age appropriate)	- Administered to some children in second year (1974-75) to determine appropriateness for screening; and used in third year (1975-76).
D. Picture Completion Subtest from the WPPSE or WISC (as age appropriate)	- Administered to some children in second year (1974-75) to determine appropriateness for screening. No further use was made of test.
E. Draw-A-Person Test (scored according to Goodenough)*	- Used for children in third grade and above, over all three years.

*D.B. Harris, Children's Drawings As a Measure of Intellectual Maturity (New York: Harcourt, Brace and World, Inc., 1963).

CHAPTER THREE

DEVELOPMENTAL SCREENING FINDINGS

Developmental (psycho-educational) screening covered three academic years--1973-1974, 1974-1975, and 1975-1976--in 16 schools in the Checkerboard. This chapter reports the basic results of the screening.

In what follows, reference is made to two types of screens: original screens and rescreens. An original is the first full screen given a child and includes testing in four areas: intellectual functioning, visual-motor perception, English language facility, and emotional adjustment. Rescreens are tests on children previously given an initial or full screen. Rescreens, however, are not necessarily full screens; that is, rescreens were done only in those areas in which a child scored low on his/her original screen.

Number Screened, Sex and Ethnicity

The number of original screens and rescreens administered over the three years appear below. There were 1,156 original screens and 734 rescreens administered for a total of 1,890. Of the 734 rescreens, 156 were second rescreens.

School Year	Original Screens	Rescreens	Total
73-74	643	3	646
74-75	304	352	656
75-76	209	379	588
	1,156[1]	734	1,890

[1]The number of children screened at least once during the three years was 1,158. The 1,156 total results from a failure to record the year of screening for two children.

The number of children receiving original screens and only one or more rescreens was as follows:

Initial screen only	590
Initial and one rescreen	407
Initial and two rescreens	158
Initial and three rescreens	3
Total children	1,158

Since the screening was limited to those in kindergarten (including Headstart) through grade three, most of the children were under nine years of age. Those children nine years or over, most heavily represented among the Navajo, were over age for their school grade. Boys and girls were essentially evenly represented in all three ethnic groups. By ethnicity, Navajo children accounted for 58% of the total, those with Spanish surnames, 31%, and Anglos 11%.

Rate of Participation

The target population were those children enrolled in kindergarten through grades three in 16 schools and Headstart program in the Checkerboard. The average enrollment in the grades screened was 865 over the three years. Thus, the total number of children screened at least once by the project exceeds the average enrollment by some 293, which principally reflects the entry of new and younger children into the schools. Of the 876 children enrolled in the final year of screening, 616 were screened in the two previous years or in the final year which represents 70.3% of the target population. The 30% loss was due primarily to school absence at the time of screening or to lack of parental permission.

Indexing Screening Test Scores

The findings on developmental screening are reported in two ways. The first is a nine-point scale (six for emotional adjustment) for indexing a child's developmental level for each of the four areas. The second gives the means and standard deviations of the children on the various tests used for screening, along with the norms for these instruments, for comparative purposes. The indexing procedure requires explanation.

The purpose of the index was to summarize findings and to equate screening results obtained by different instruments. To accomplish this, guidelines were devised to transform scores on each of the several tests into an index or developmental score. These guidelines are given in tabular form in Appendix A. The index scores range from one through nine for intellectual functioning, visual-motor perception and use of English language. The scale for emotional adjustment[2] ranges from one through six.

For intellectual functioning, the problem was to equate scores from a combination of tests--Wechsler subtests (block design, etc.), the Human Figure Drawing (HFD), and/or the Draw-A-Person (DAP) to give a single score for a child. The base for the procedure was to equate an index score of three with a Wechsler subtest score one and one-third standard deviations below the subtest mean of 10 and to assign a functioning index using Wechsler and other test results as shown in Appendices A_1 and A_2.

For visual-motor perception, Bender error scores were transformed to the nine-point index so that scores indicative of visual-motor problems for children

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[2]Index scores of one through nine for the first three functions indicated a superior level. For emotional adjustment, this level was omitted to give a six-point index since it is difficult to measure superior emotional health.

of different ages would have index numbers of three or less. The rules for this are given in Appendix A_3 .

For the expressive use of English, the same procedure was followed for assigning index numbers to scores on the Wechsler vocabulary subtests and the Wide Range Achievement Test (WRAT). Again, index of three was made equivalent to a score of five or six on the Wechsler, a distance of at least one and one-third standard deviations below the norm mean of 10. For the WRAT, an index of three was equated with scores indicating a reading level of 12 to 17 months below grade level as shown in Appendix A_4.

Assessment of emotional adjustment was based on the HFD and the Bender. The number indicators on each of these tests were combined and given scores on a six-point index so that an index number of three or less reflects possible problems. The rules for this are given in Appendix A_5.

The next tabulation shows the relationship between being low on one developmental function and being low on others, for the five to eight year old children. For example, 103 children were indexed low in intellectual functioning. Of this number, 4.9% were low in this area only, 15.5% were low in two areas (intellectual and one other), and 79.6% were low in three or more areas. Just over half (54%) of those low on visual-motor perception were low in three or more functions, while only a quarter of those low in Engligh use and emotional adjustment were low in three or more functions. Thus, children low on intellectual or visual-motor perception were much more likely to be low in two or more areas.

	Intellectual (N = 103)	Visual Motor (N=204)	English (N = 559)	Emotional (N = 509)
Low on this Function only	4.9	5.4	36.7	17.9
Low on this Function:				
-and one other	15.5	40.6	38.6	44.2
-and two others	55.3	41.6	20.2	23.0
-and three others	24.3	12.4	4.5	4.9

The next display shows the percentage of the children low on each developmental function by two age groups: five to eight years old, and nine years and over. This age breakdown was done to remove the effect of older children who tended to be over-age for school grade. The table shows that the proportion of older children low on intellectual functioning was almost three times (30% to 11.6%) that of the younger ones: on visual-motor perception, the proportion low was twice that (45% to 22.8%) of the younger group. Half of the older children and nearly 60% of the younger ones had difficulty in the use of English. This, as will be shown later, was most pronounced among the Navajo. The percentage low on emotional adjustment was on the same order as that for the use of English. However, the screening results on emotional adjustment are questionable and are discussed later in this chapter.

Developmental Function	Age			
	5 - 8 Years		9 + Years	
	N	%	N	%
Intellectual	975	11.6	167	30.0
Visual-Motor	973	22.8	167	45.0
English	941	57.9	165	49.7
Emotional	974	55.6	168	48.8

Number of Developmental Problems

Before examining the screening results in greater detail for each of the functional areas, an overview of the screening findings is given to show the percentage of children indexed as low (score of three or less) in one or more of the four functional areas. The results for the 1,157 children for whom sex and ethnic identity were recorded were as follows:

Percentage Distribution of Number of Developmental Areas Indexed Low by Ethnicity and Sex

Number of Areas Indexed as Low	Ethnicity			Sex		
	Navajo	Spanish	Anglo	Male	Female	Total
	N=657	N=348	N=124	N=576	N=579	N=1,157
None	7.5	24.7	33.9	14.4	14.1	15.7
One	39.6	32.5	39.5	36.6	38.2	37.4
Two	32.7	28.2	20.2	32.3	27.8	30.1
Three	16.9	12.1	5.6	13.9	14.2	14.0
Four	3.3	2.6	0.8	2.8	2.8	2.8

The percentages range from 7% for the Navajo to 34% for the Anglo. The proportion of Anglo children low in three or more areas was smaller than that of the Navajo and Spanish by one-half to one-third. In general, as the fourth and fifth columns of the table show, there were no marked differences between girls and boys.

Intellectual Functioning

Five different tests were employed at one time or another to assess intellectual functioning during the three years of screening in an effort to determine the most culture-free instrument. The two basic tests used throughout the program were the HFD for children in kindergarten through grade two and the DAP for children in grade three. Subtests of the Wechsler Intelligence Scale for Children were used for assigning index scores on intellectual functioning for children tested with the Wechsler Information and Design tests. A child's score on the HFD or DAP took precedence over the Wechsler score; that is, Wechsler scores could only increase the index of intellectual functioning. The Wechsler Picture Completion subtest was administered to some children to explore its usefulness in the second year of screening. No further use was made of this subtest, and results from this

TABLE 3.1: Mean Scores and Standard Deviations for Wechsler Information, Block Design, Picture Completion, and Vocabulary Scores, by Age and Ethnicity.

	NAVAJO			SPANISH			ANGLO		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Information									
4-0 to 8-11 years	298	4.9	2.2	154	7.6	3.0	57	10.4	2.9
9-0 to 11-11 years	31	3.2	1.5	4	3.5	1.7	-0-	-0-	-0-
Total	329	4.7	2.2	158	7.5	3.1	57	10.4	2.9
Block Design									
4-0 to 8-11 years	80	10.1	3.1	34	8.9	2.9	17	10.4	3.6
9-0 to 11-11 years	46	9.8	3.2	19	7.6	3.4	-0-	-0-	-0-
Total	126	10.0	3.1	53	8.5	3.1	17	10.4	3.6
Picture Completion									
4-0 to 8-11 years	45	10.3	2.9	13	8.9	3.6	-0-		
9-0 to 11-11 years	33	9.9	2.3	2	9.5	2.1	-0-		
Total	78	10.1	2.7	15	9.5	2.1	-0-		
Vocabulary									
4-0 to 8-11 years	431	4.2	2.6	260	6.7	2.8	106	9.3	2.6
9-0 to 11-11 years	47	3.9	2.3	19	4.6	2.0	-0-	-0-	-0-
Total	478	4.1	2.6	279	6.6	2.8	106	9.3	2.6

exploration were not used to assign index scores on intellectual functioning. The scores are given in Table 3.1 for comparative purposes.

Intellectual functioning, as indexed by the various Wechsler subtests, is shown in the table by age and ethnicity. The mean scores are given separately for younger and older children. As shown in the table, the older children had lower means on all tests with one exception--picture completion for older Spanish children.

The Wechsler Information subtest, used only in the first year of screening, was administered to 544 children. The 298 Navajo children under nine years of age screened by the test had a mean of 4.9, about one-half of the standard mean of 10, and considerably under the means of the 7.6 and 10.4 of the Spanish and Anglo children, respectively. Culturally, and in other ways, the Anglo children were most like the children on which national norms were based, the Navajo most unlike the norm population, and the Spanish somewhere between. The results reflect these differences and probably represent a cultural bias in the test; consequently it was deleted from the screening battery after the first year.

A rather different pattern emerges when scores on the Block Design and Picture Completion subtests are examined. The means of just over 10 for the Navajo is at the national norm and, although not quite as large as the 10.4 of the Anglos on the Block Design[3] , the Navajo means are greater by about one-third standard deviation than those of the Spanish children. Thus, the Navajo children approximated the national norms on these two subtests. The mean of the Spanish children falls approximately one-third standard deviation below the national norm.

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[3]No Anglo children were given the Picture Completion test.

A second measure of intellectual functioning was based on the DAP for third grade children. Ninety-five Navajo, 67 Spanish, and 16 Anglo children were screened with the DAP. The means and standard deviation of scores obtained are displayed below for children seven through eight years, and those nine through thirteen. Although the numbers are relatively small, the Navajo means exceed those of the Anglo and Spanish. Among the younger children, the Navajo mean of 100 exceeds that of the Anglo by seven points and the Spanish by 19 points. The older Navajo and Anglo children did less well than their younger counterparts; for the Spanish the range of performance was greater within the younger group but the mean was not superior to that of the older children.

Draw-A-Person Means

		Navajo			Spanish			Anglo		
	Years	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Age:	4.5 to 8.5	19	107.2	19.1	34	88.2	26.2	10	100.7	21.4
Age:	9.0 to 11.5	76	89.9	19.2	33	87.8	15.1	6	84.3	10.1
	Total	95	93.3	20.3	67	88.0	21.3	16	94.6	19.4

On the nine-point index of intellectual functioning, the percentage of children indicated as low was as follows:

Intellectual Functioning by Ethnicity

	(Percent Low) Number	Percent
Navajo	649	15.4
Spanish	341	13.5
Anglo	123	11.4
Total	1,113	14.2

By these results the proportion of children low in intellectual functioning was 14.2% with a range of only four percentage points among the groups.

Intellectual Functioning and Age

The percentage of children indexed low on intellectual functioning is given in the next table, by year of age. Almost a quarter (22.5%) of the 311 five-year-olds scored low, but only four to five percent of the six and seven year-olds scored low. At age nine, the percentage scoring low jumps to 25% and continues to rise to about 50% at ages 11 and 12.

Intellectual Functioning by Age
(Percent Low)

Age	4	5	6	7	8	9	10	11	12
Number	8	311	279	206	171	97	47	19	2
Percent	12.5	22.5	5.4	3.9	10.5	24.8	31.9	47.4	50.0

Visual Motor Perception

The Bender Gestalt test was administered to 1,140 children over the three years. Appendix B gives detailed results in means and standard deviations by age for each ethnic group for 1,079 of the children. The mean of the 144 five-year olds was 13.9--almost identical to the 13.6 mean of the Koppitz[4] norm for this age. From age five and one-half on, the majority of the children fell considerably short of the Koppitz norms.

The project assigned index scores to transform each child's Bender score to the nine-point index (see Appendix A_3). On this basis, any child with an index of three or less was considered low on visual-motor perception. Of the children for whom complete data were available, 26.3% were indexed low on this function. As the following distribution shows, the Navajo and Spanish had identical percentages low, about 26%, and Anglos 20% low on visual-motor perception.

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[4]Elizabeth M. Koppitz, the Bender Gestalt Test for Younger Children. (New York: Grime and Stratton, Inc., 1963). p. 188.

Visual-Motor Perception
(Percent Low)

	Number	Percent
Navajo	650	26.8
Spanish	339	26.5
Anglo	122	20.5
Total	1,111	26.3

By sex, the percentage low was identical--26%. By age, as the next table shows, the same pattern on intellectual functioning held for visual-motor perception: over one-quarter (27.8%) of the five-year-olds were low, while only one-fifth (20%) of the six and seven-year-olds were low. Above eight years of age, the percentages rise upward from about 44% to more than 60%, a reflection of the poorer performance of the older, behind-in-grade children, and those called beginners.[5]

Visual-Motor Functioning by Age
(Percent Low)

Age	4	5	6	7	8	9	10	11	12
Number	8	309	277	207	172	97	47	19	2
Percent	12.5	27.8	20.9	19.3	23.3	44.3	38.3	63.2	50.0

English Language Facility

Over the three years of screening, 1,106 children were screened for knowledge and expressive use of English. The vocabulary subtests of the WPPSI and the WISC were used as age appropriate except for children in grade three,

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[5]Most schools in the Checkerboard Area have a class called beginners for children not able to achieve at the first grade level and too old for kindergarten.

for whom the WRAT was used. Results obtained by use of the Wechsler Vocabulary tests are given in Table 3.1. The Navajo demonstrated the least knowledge of expressive English: the 431 children (4 to 8.11 years) had a mean of 4.2, almost six points below the norm mean of 10. The Spanish showed a somewhat better English facility with a mean of 6.7, roughly one standard deviation below the norm; and the 106 younger Anglos had a mean of 9.3, which approaches the norm.

In all, 173 children, eight years of age and over, were given the WRAT which has a standard mean and deviation of 100 and 15, respectively. Their mean scores by age group are shown in Table 3.2. The 94 Navajo children had a mean of 85.9; the 63 Spanish, 103.8; and the 16 Anglos, 112. Examination of the scores by age shows a steady decline for the Navajo and the Spanish from age nine on. If only the eight year olds are considered (see last row of Table 3.2), the Navajo were at the test norm with a mean of 99, the Spanish mean was 114, and the Anglo 109.

The number and percent of the children indexed low in English usage are shown in the next tabulation. Almost eight-tenths (78.8%) of the Navajos were low, over four-tenths of the Spanish, and only one-tenth of the Anglos. In part, but only in small part, the proportion of Navajo indexed as low was accounted for by the fact that they had a larger proportion of older, delayed-in-grade children. Removal of older children reduced the Navajo percentage by two points. There were no sex differences in the use of English.

Table 3.2 Wide Range Achievement Test: Level I Mean Reading Scores*, By Age and Ethnicity

Age (Years-Months)	Navajo N	Navajo X	Navajo S	Spanish N	Spanish X	Spanish S	Anglo N	Anglo X	Anglo S
7-0 to 7-5	2	100	--	--	--	--	--	--	--
7-6 to 7-11	--	--	--	1	160.0	--	--	--	--
8-0 to 8-5	5	97.2	6.5	9	112.0	21.2	3	98.3	--
8-6 to 8-11	12	98.8	11.0	20	115.1	25.6	7	113.4	14.4
9-0 to 9-5	11	92.6	16.0	13	102.4	19.7	4	120.3	--
9-6 to 9-11	24	84.8	6.9	4	103.5	19.5	1	99.0	--
10-0 to 10-5	23	83.2	8.0	6	90.8	13.2	--	--	--
10-6 to 10-11	8	74.2	4.0	4	81.5	--	1	125.0	--
11-0 to 11-5	4	77.3	--	3	79.3	--	--	--	--
11-6 to 11-11	2	69.0	--	3	72.3	--	--	--	--
12-0 to 12-5	2	66.0	--	--	--	--	--	--	--
12-6 to 12-11	--			--			--		
13-0 to 13-5	1	66.0	--	--	--	--	--	--	--
Total	94	85.9	12.6	63	103.8	25.2	16	112.0	20.3
8-0 to 8-11	17	99.1	10.0	29	114.1	24.4	10	108.9	15.5

*Standard deviations not given for numbers less than five.

Use of English
(Percent Low)

	Number	Percent
Navajo	622	78.8
Spanish	334	42.8
Anglo	123	9.9
Total	1,079	

Emotional Adjustment

Assessment of emotional adjustment was made by use of the Bender Gestalt and Human Figure Drawing tests. Scoring of both tests followed the Koppitz procedure.[6] When the scores on these tests were transformed to the six-point index (See Appendix A_5), over half (54.9%) of the 1,142 children tested were indexed as low on emotional adjustment. Slightly fewer girls (53%) than boys (57%) were low. As the following distribution shows, the former pattern among the three ethnic groups were quite similar.

Emotional Adjustment
(Percent Low)

	Number	Percent
Navajo	648	53.5
Spanish	341	56.3
Anglo	124	58.9
Total	1,113	

[6]Elizabeth M. Koppitz, Psychological Evaluation of Children's Human Figure Drawings. (New York: Grime and Stratton, Inc., 1968).

Almost three-quarters of the four and five-year-olds were indexed low on emotional adjustment. The 208 seven-year-olds gave evidence of better adjustment than any other age group; less than four-tenths of them (38.5%) were scored low. As the next table shows, other ages ranged around 50% low on emotional adjustment on the index.

Emotional Adjustment by Age
(Percent Low)

Age	4	5	6	7	8	9	10	11	12
Number	8	311	277	208	170	97	48	19	2
Percent	75.0	73.3	51.3	38.5	52.4	44.3	56.3	57.6	50.0

The number of children indexed as low on emotional adjustment is high. The finding could be indicative of widespread emotional problems, the result of screening methods, scoring procedures, the tests used, or a result of all these factors. In the next section, corroborative findings on speech and language from a study of 150 Navajo children are given. Following this, we return to the findings on emotional adjustment to examine factors which inflated the rate of findings.

Corroborative Findings

In March of 1972, the project made arrangements with the Department of Communicative Disorders (DCD) of the University of New Mexico to screen 150 Navajo children at five different schools. By grade these children were distributed as follows:

	Number	Proportion of Enrollment
Headstart	23	.33
Kindergarten	20	.33
Beginner	42	1.00
First	38	.33
Second	27	.33
	150	

These children were given the Peabody Picture Vocabulary Test[7] (PPVT), Form B, an articulation screening test, the Bilingual Syntax Measure[8] (BSM), the Developmental Test of Visual-Motor Integration[9] (V-MI). A cursory "oral-peripheral" examination was made to assess the structural and functional adequacy of each child's face, lips, nose, outer ears, tongue, frenulum, hard palate, velopharyngeal movement, tonsils, and teeth with respect to speech production. Any potential health problem, whether or not related to speech, was noted for follow-up. The findings on the tests and the oral-peripheral examination were as follows:

The Peabody Picture Vocabulary Test

This test assesses a child's comprehension of single English words. On the basis of national norms, the performance of 81% of the 141 children with usable test results were judged inadequate and they were potential candidates for therapy, i.e., language stimulation.

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[7]Lloyd M. Dunn, Peabody Picture Vocabulary Test. (Circle, Pines, Minnesota: American Guidance Service, Inc., 1959)

[8]M. K. Burt, H. C. Dulay, E. Hernandez, Bilingual Syntax Measure--English, (Dallas, Texas: Harcourt Brace Jovanoich, Inc. 1975)

[9]K. E. Berry and N. A. Buktenica, Developmental Test of Visual-Motor Integration (Chicago: Follett Educational Corporation, 1967.)

The Articulation Screening Test

Failure on this test, designed to determine the adequacy of speech production, does not necessarily indicate a speech disorder, but suggests a need for articulation evaluation. Sixty percent of the children tested were judged as having adequate articulation, 31% were judged mildly inadequate, and 8% moderate to severe inadequacy.

The Bilingual Syntax Measure

This instrument tests a child's oral proficiency in English as a second language. Five levels of proficiency are used: no English, receptive English, survival English, intermediate English, and proficient English. Only those children at the last two levels were judged as adequate. On this basis, 56% of 140 children performed inadequately.

Developmental Visual-Motor Integration

The Visual-Motor Integration Test, still under development, aims to measure the degree to which visual perception and motor behavior are integrated in young children, requires the child to copy a series of geometric designs. Scores based on the drawings are converted to age equivalents. Two levels of inadequacy were used: Inadequate--scores one or more years below chronological age; and Teacher Alert--scores six months up to one year below chronological age. Only 76 of the 150 children were tested on this instrument. Of this number, 21% were inadequate and 29% were identified as "Teacher Alerts".

Oral-Peripheral Examination

One hundred forty-one children were examined for structural and functional problems which might affect speech production: 42% showed indications of problems and were recommended for follow-up.

Conclusion

Results of these special studies tend to confirm the findings on English proficiency and visual-motor perception of the EPSDT screening. It will be recalled that 79% of the Navajo children were indexed as low in use of English. This is within two percentage points of the PPVT results. Similarly, the Bilingual Syntax Measure showed 56% of the children as having only survival level English or less. The EPSDT screening found 26.8% of the Navajo children low on visual-motor perception. The DCD screening showed 21% of the children as inadequate and 29% as marginally adequate. In sum, the DCD screening, using different instruments and certified speech pathologists and audiologists, produced findings on Navajo children in use of English and on visual-motor perception quite similar to those obtained by the EPSDT screening.

Queries on Findings and Methods

This section addresses briefly three issues which emerged from the screening. The first concerns the rate of positive findings on emotional adjustment. The second had to do with the use of indigenous, project-trained paraprofessionals as developmental screeners: How did their screening results compare with those of the professionals? The third issue considered near the end of the screening was: How do teacher assessments of children compare with screening findings?

The High Rate of Emotional Findings

The fact that over half of the children were indexed as having problems in emotional adjustment is disturbing for several reasons. If emotional problems are so widespread among the Checkerboard children, one has to ask what the future holds for them, particularly in view of the scarce treatment resources

in the area. Such results may, of course, stem from the tests used, the testing and indexing procedures, or from both sources. Although it is not possible to explore the problem adequately in this report, some observations are called for.

1. In the latter part of the second year of screening, a change of staff occurred and a new person shared responsibility for scoring the HFD and Bender used for testing emotional adjustment. Both were professional with Master's Degrees and were qualified diagnosticians. There was a transition period of four months during which the two staff members worked together and careful attention was given to orientation before the new staff person assumed full responsibility for scoring during year three.

2. The number of HFD emotional indicators scored increased markedly in the second and third years. In the first year, 40.6% of the children were indexed as low on emotional adjustment; in the second and third years[10] the percentages rose to 59.5% and 92.7%.

3. Most children in the Checkerboard experience a cultural and linguistic dichotomy when they enter the school environment which is predominantly English speaking and oriented to Anglo expectations and standards.

4. The extent of mental health and mental health related problems, such as alcoholism, are well known in the Checkerboard. A recent study by Bennet and Winchester[11] on the costs of mental health, accidents, and violence problems in New Mexico provides data indicative of serious problems throughout the state. The probability of death by motor vehicle accidents is approximately 50% greater than the national average: among male native Americans, the rate per 100,000 is 250, or four times the national level. Suicide rates in nearly every age group for males and females exceeds national levels. Cirrhosis of the liver is generally above the national average at all ages for both males and females, and in the 25-34 age group, the male ratio is over three times greater. Although factors behind these rates for older persons cannot be "extrapolated" downward to children, they clearly suggest the need for early detection and preventive mental health programs in the state.

As the matter now stands, conclusions are not in order for the screening findings on emotional problems and additional research is warranted.

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[10] The percentage low for ethnic groups by year varied by less than two percentage points in the first and third years, and from zero to six points in the second year. Thus, the increase was not associated with ethnicity.

[11] Max D. Bennett, Ph.D. and Janet Winchester, "Mental Health and Accident - Violence in New Mexico: A Benefit/Cost Perspective". A Report to the New Mexico State Health Planning and Development Agency, Health and Social Services Department, State of New Mexico, June 30, 1977.

Several points should be made regarding future use of the HFD for screening. Although the experience of this project indicates that the HFD is easily and quickly administered and does not require administration by professionally trained persons, any future use of the HFD should be carefully considered. Special attention should be given to scorer calibrations with independent checks for reliability and consistency over time. More attention is also in order regarding features used as emotional indicators to select those with the greatest discriminative ability and which, at the same time, reduce the degree of subjective judgment required in scoring. This project for example, employed 14 of the 30 Koppitz (1968:41) indicators (see Appendix A_5 for the index rules). Of these, four were from the eight Koppitz indicators which differentiated between her patients and well-adjusted pupils at p values of .05 or better. Two had p values of .10, and because of small frequencies, Koppitz reported no p values for the other eight. Examination of the screening results for each of the four indicators with a Koppitz p value <.05 showed that some were more subject to variation between years of screening (with age controlled) than were others. For example, the percentage of children scored as having produced tiny figures and figures with hands cut off were consistent over the three years, while the percentage for slanting figures and short arms increased markedly.

Paraprofessional vs Professional Screening

Screening conducted by persons at different levels of training, knowledge, and skill immediately raise questions as to quality (correctness) of findings and costs. Other things being equal, a more highly trained staff costs more. On this project, the developmental screening was conducted by two Master's level persons trained in testing, and three indigenous, project-trained staff persons. We refer to the latter as paraprofessionals and the former as professionals in this discussion.

Periodic checking on the screening process did not indicate any marked differences between the professionals and paraprofessionals. However, at the close of the screening, the average index scores of both sets of screeners on each of the four functions were compared and tests run between the means on each function. The number of cases screened by the professionals ranged from 99 on English to 154 on visual-motor; however, since most of the screening was done by paraprofessionals, the number of cases screened by them ranged above 600 on all four functions.

The t values for the means on the four functions ranged from 0.14 to 1.19, and the two- tail probabilities ran from 0.23 to 0.89. None of these differences approached statistical significance. This indicates several things: (1) indigenous workers can be trained to carry out developmental screening such as that done by the project, (2) the training offered by the project was effective, and (3) the training and use of indigenous workers can effect considerable savings.

Teacher-Screening Comparisons

A rather obvious question which arose during screening was: Why conduct developmental screening on school children? Is not the assessment of teachers who know their pupils more accurate and less costly than special screening such as that conducted by the project? To explore this question, teachers in two small schools were asked to rate their students on each of the four developmental areas. In all, 90 children were rated but, since 56 of this number had been screened the year before, only 34 were screened immediately after having been rated by the teachers. In making their judgements, the teachers simply indicated whether, in their judgement, a child was low on a given function.

The greatest amount of agreement, 85.3% (29/34) between teacher ratings and screening occurred on intellectual functioning. Of the five children where disagreement occurred, the teachers rated four as low while the screening did not. The reverse occurred in the case of the other child. The lowest agreement was on emotional adjustment with 38.2% teacher-test agreement. The level of agreement was 58.8% on visual-motor functioning and 61.8% on use of the English language. For visual-motor perception, teachers rated seven children low while screening declared 11 low, but only two of these were the same children. Similarly on the use of English, teachers rated 12 low and the test 15, but only seven were the same children. On emotional adjustment, the screen indexed 32 lows and teachers 11; however, all of these 11 were also declared low by the screen.

The 59% agreement on visual-motor function may have been low because some teachers were less than fully clear about the nature of visual-motor perception. The 62% agreement on use of English is somewhat disturbing also. Teachers rated 35% low on English and screening 44% low--fairly close agreement. However, of the total 20 children rated low by the teacher and the screener, only seven were rated low by both of them. Therefore, while the percentages rated low are similar, the majority of the children rated low were different children.

Although agreement was lowest on emotional problems, it is notable that all of the children identified by teachers as having an emotional problem were so identified by the screening.

From this minimal evidence, it is reasonable to suggest that neither teachers nor screening can be substituted for the other as a means of detecting children with developmental problems. Since teacher ratings of children is relatively quickly and easily done, it might be well to have them do ratings

of their pupils in those schools where screening such as EPSDT is conducted. Such a joint approach should be a relatively fast and inexpensive way to identify children most likely to be in need of help. In the event that this approach is used, some orientation and training of teachers would be in order.

Summary and Conclusions

Some 1,156 Navajo, Spanish and Anglo children were screened in four developmental areas--intellectual functioning, visual-motor perception, use of English, and emotional adjustment. For the most part, these children ranged from preschool programs through grade three. The percentage of the children indexed low on intellectual functioning ranged around 13%. There were no sex differences and little ethnic differences. Older children in all ethnic groups gave evidence of poorer intellectual performance for their age than younger children. The reason for this is not clear; however, the older children were generally one or more years behind in school grade, which may have been selective.

On visual-motor perception, about 27% of the Navajo and Spanish children gave evidence of some difficulty; the Anglos' percentage was some six points less than this. No sex differences appeared from the screening findings, but the older children did less well for their age than the younger ones. Findings on visual-motor perception from an independent study of 150 Navajo children were in agreement with the screening findings.

Not surprisingly, the most marked differences among the ethnic groups occurred with respect to the use of English. Almost 80% of the Navajos were indexed low on the use of English; just over 40% of the Spanish, and 10% of the Anglos were judged low. There were no sex differences and the effect of age was less marked. Again, the results of an independent study by the University of

New Mexico on 140 Navajo children found 56% to have survival level English or less. One can only speculate as to what might have been the results had the screening been done in Navajo or Spanish.

Even though possible conclusions about emotional problems among children screened cannot be drawn, the lowest percentage of children "low" in emotional adjustment (40.6%) the first year is exceedingly high --it is possible that this is the category of greatest need in Checkerboard.

CHAPTER FOUR

MEDICAL SCREENING: ORGANIZATION AND NEW APPLICATIONS

This chapter and the one following deal with the medical screening carried out by the project during the second and third years. Background is given on the project's transition from a demonstration principally devoted to developmental screening, to its expansion to a full-scale medical and developmental screening program in the Checkerboard schools. This account is followed by a description of the organization of the medical screening and the changes made during the two years. The chapter concludes with brief descriptions of two new child health programs which are utilizing the knowledge and experience gained from the Checkerboard EPSDT demonstration. The first of these programs is a newly organized school health/screening program of CAHS. The second is a developing statewide school health program jointly undertaken by the New Mexico School of Medicine Department of Pediatrics, the New Mexico Pediatric Society, and the New Mexico State Department of Health and Social Services.

The Transition to Medical Screening

The developmental screening program was funded to demonstrate effective ways of conducting EPSDT developmental screening. The project was, in fact, an addition to an existing rural health program[1] operated by CAHS with funds from the Social and Rehabilitation Service (SRS). As a part of this program and by contacts with the schools, CAHS provided school health services and

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[1]The objective of this rural health project was to develop a model health system in an economically depressed rural area.

medical screening for the Checkerboard schools. The developmental screening project was thus within CAHS, but organizationally separate from its school health and medical screening program. It was, however, to work in conjunction with the medical screening program and to refer any children to it who might be in need of medical screening, diagnosis or treatment.

Medical screening for a number of conditions was provided in the area, but the screening tended to be a piecemeal, uncoordinated effort by CAHS, the State Health Agency, and the Indian Health Service. The results of this screening cannot be accurately described because of inadequate and scattered records among these various agencies.

During the first year of the developmental demonstration, HSRI was asked by SRS to incorporate the Cuba screening--medical and dental--into what was then referred to as the "Common Data Base".[2] This took place about midway through the first year of the developmental project. At that time it became evident that although many children were being medically screened, there were problems with the system. The program had no central administrative focus either in the schools or in CAHS to assure that screening procedures were standardized, to maintain accurate records, and to provide follow-up for diagnosis and treatment. In great part, the screening was a series of discrete episodes aimed primarily at the detection of health problems with little systematic attention to the health of the whole child.

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[2]The Common Data Base was an after-the-fact attempt to incorporate the screening findings and experiences of four differently conceived EPSDT demonstrations into one information and "evaluation" system. The other three projects were located in Contra Costa County, California; Washington, D.C.; and San Antonio, Texas.

On the basis of these observations, a recommendation was made by HSRI to modify the entire screening effort by combining developmental and medical screening into a single program to overcome these deficits and to explore ways of conducting developmental and medical screening as a unified effort. The recommendation was implemented and, in the second and third years of the project, medical and developmental screening was carried out by a single staff.

The Medical Screening: Structure and Process

In the first year of this effort, medical screening was conducted as soon as possible after the start of the school year on the premise that the remainder of the year could be devoted to follow-up and other project activities. This amounted to a mass effort requiring high commitment and much coordination within the staff, and between the schools and the project. The staff went about the task with intensity and excitement, but enthusiasm waned in the face of all the post-screening paperwork and the more diffuse process of providing feedback to schools and parents, and in follow-up. The extended lapse of time between screening and follow-up[3] resulted in wasted effort as some findings were out of date or questionable by the time follow-up occurred. Perhaps the most undesirable result was that the sense of immediacy to find problems and do something about them was lost.

In the second and final year of the medical screening, medical and developmental screening were conducted in one school at a time by allocating three consecutive weeks to each school: one week for medical screening, one for

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[3] Additional delay in the post-screening activities also came about when the HSRI information system which was to give the feedback on findings and follow-up reminders became operational too late in the year to be of help.

developmental screening, and one for feedback and initiation of follow-up to get children into treatment.

This approach required much planning to assure effective screening with a minimum of interruption of school schedules. The scheduling required visits to the schools to plan s cific dates for all phases of the work. After the planning of schedules and other arrangements, all schools were informed of screening dates. Additional visits were made to the schools and detailed explanations were given to teachers and administrators concerning the way screening would be conducted, who would do the screening, and the amount of classroom interruption to be expected. That all teachers were to be given the screening results for each of their pupils was stressed, and descriptions were given of action to be taken to obtain diagnostic and treatment services for children in need of them.

Prior to going to a school for screening, an up-to-date roster was obtained and a screening file prepared for each child. The project data clerk, in preparing the files, included a copy of permission forms signed by parents; thus assuring that no child would be screened without parental permission.

The number of children to be screened at each school was carefully determined in order that adequate supplies and staff would be on hand. The amount of time available in a day for screening was limited by recess and lunch periods, by school bus schedules, and, at times, by other school activities, which left three to four hours per day for screening. Logistics and timing were critical. Delays meant extra trips to schools over long distances to screen a few children. Such occasions disrupted school routines as well as the screening schedule.

The procedure for screening usually involved calling ten or so children from a classroom at a time. At the first station (see Figure 4.1) each child's health

records were examined to determine: (1) the immunization status of the child; (2) if the child had been screened or tested for a given condition in the past year; and (3) to note any special health problems or conditions, e.g., allergies, which a child might have.

After this check, each child proceeded in order to several stations set up within the school. Although the arrangements varied according to the facilities and conditions at the several schools, the stations and persons responsible for the screening were generally as outlined in the following paragraphs, along with mention of problems encountered in the screening procedure and the changes made to correct them. The responsibilities of the various categories of manpower changed during the project. This was primarily to assure efficient utilization of skills and time and to increase job satisfaction. (For specific changes, see Figure 4.2.)

Records were the responsibility of a data technician. At this station each child was checked in and received his chart. At the end of the screen, he returned his chart to this station where it was marked as a completed or incompleted screen. Considerable problems were encountered in the first year in keeping records in order. To correct this, a data technician was added in the second year to maintain control over the records and to avoid missing records, incomplete referrals, and duplication of records.

Height and weight measurements were the responsibility of a screening aide. The children removed their coats and shoes before being weighed. During the first year, the weighing technique was not standardized and too many children were referred inappropriately. Also during the first year, the scales at each school were used. The results proved unreliable so the project purchased its own scale, which had to be calibrated after each move.

Urinalysis was the responsibility of a screening aide. Bathrooms were needed. If they were too distant from the screening area, tables for testing were set up near the bathrooms. Each child's name was written on his/her cup to reduce exchanging cups and the children were instructed to dispose of the urine and the cup after the test was completed. If the test showed one or two plus ketones, glucose or protein, a second specimen was obtained. In spite of care in the processes, a high rate of false positives occurred. This led to the suggestion that a test for specific gravity be used to clarify significant proteinuria in future screening.

Vision screening, also conducted by aides, required an area 20 feet in length, out of the line of traffic, for a Snellen wall chart. Analysis of the vision findings over two years revealed a large number of false positives. Although an illuminated chart used the second year reduced the false positives, problems remained. In most schools it was difficult to find an area where distractions did not occur. For future programs it is recommended that a viewer-type test be used which requires less space and reduces the effect of distractions. It is also probable that the rate of false positives resulted from the occasional use of inadequately trained volunteers.

Test for tuberculosis (PPD: purified protein derivative) was the responsibility of either a register nurse (RN) or a licensed practical nurse (LPN). A table screened off from view, to avoid alarming children next in line, was used; syringes were drawn in advance and kept out of sight for the same reason. A calming effect at this station seems to have been achieved by having other procedures done before the "shot". Thus, temperatures were taken with disposable thermometers, and blood pressure readings were made prior to the "shots". These procedures seemed to intrigue some children and reduced the number who became upset by anticipation of

the tuberculin test. If a child refused to cooperate, the screener simply went on to the next child without argument. Handled in this fashion, some children would come back and ask for the "shot" later.

The hematocrit was the responsibility of an RN or LPN who worked at a table near an electrical outlet for the centrifuge and screens. "Smile" or "Happy Face" bandaids were used to cover the puncture and were a big hit with the children. They proudly displayed these to unscreened classmates who decided they would like to have one also. Unfortunately, the manufacturer discontinued production of these items. The original machine spun only six to eight capillary tubes at a time and this produced a bottleneck in the screening line. Occasionally tubes would be broken and the child would have to undergo a second drawing of blood. These problems were reduced in the second year with a new machine which processed 24 tubes, and by dividing each blood sample into two tubes. In the case of breakage, the second tube was substituted.

Hearing, the responsibility of an audiometric technician, required a separate room with electrical outlets. The test took longer than other procedures, but, since it followed the physical, it did not create a serious bottleneck. In the first year, screening was done with a sweep screen belltone audiogram. If a child failed this test, a complete audiogram was performed.

An impedance bridge was purchased for use in hearing screening for the second year. The advantages of impedance audiometry include (1) no response is required from the child, (2) it is somewhat faster than the audiograms, and (3) it is more sensitive for detecting conductive hearing loss, which is prevalent among the Navajo. Use of the impedance bridge required additional training, and the PNP and an LPN attended a short course offered by the distributor in

Dallas, Texas. Later a Navajo aide was sent to Albuquerque for a three-week training course in acoustic impedance audiometry by the Sensory Disabilities Division of the Indian Health Services. The aide was certified as an audiometric technician upon completion of the course and later attended short courses on otitis media and fitting of hearing aides. The course instructor visited the project in Cuba to provide workshops and to monitor the work of the newly certified technician. Subsequently, two other aides were trained and certified as audiometric technicians.

The physical examination, the responsibility of a nurse practitioner or physician's assistant, was an unclothed examination of the eyes, ears, nose, throat, heart, lung, abdomen, genitals, skin, and a check for orthopedic conditions. The eye examination also included a check for trachoma, which is endemic to the area. The examination was conducted in a screened-off area or a room equipped with two cots, a lamp, and chairs brought by the screening team. The time required for the physical examination constituted a bottleneck in the screening line. This resulted in great part from the time required for undressing and dressing of the children. Several solutions were explored: one was to have a staff member assist each child undress and dress. The second was to examine same sex children at the same time, thus allowing several children to undress and dress at a time. A third approach was to have an assistant chart for the examiner. For future school screening, the physical could be divided into several steps done by a Registered Nurse, e.g., ear, nose and throat examination, while a nurse practitioner checks for heart murmurs, etc.

During the first year of medical screening, a physician occasionally took part in the screening; in the second year, physician's assistants participated.

The physician was too expensive for cost-efficient screening and it was difficult to rely upon part-time physician extenders who might not have the interest in screening or the time to spend away from their clinic. A full-time PNP supervised the screening and follow-up and gave selected on-site treatment under standing orders. Later, in the second year, screening and follow-up were under the supervision of a Registered Nurse.

Feedback and Follow-up: During the third year when the three-week cycle was in operation, feedback was given to school personnel during the third week. Medical findings on each child were interpreted to that child's teacher, dorm mother (at boarding schools), and parents, when available. This feedback was presented by the screening supervisor along with the psycho-educational diagnostician, who presented the developmental screening findings. The feedback process included an exchange of information with the teacher or dorm mother. Any special needs or restrictions required for individual children were discussed and reassurance offered when there was no need for special considerations.

Follow-up was also initiated during this third week and included home visits, transportation to clinics, scheduling for specialty clinics, re-testing, obtaining parental permission for treatment, and other activities. If it appeared that long-term follow-up would be required, one member of the staff was identified as responsible for case-monitoring that child and his/her family. Usually the audiometric technician followed ear and hearing problems and assisted in the specialty ENT clinics. Following ear surgery or the fitting of hearing aids, the technician provided specific education to the child and family. The aide who did vision screening primarily followed vision problems. Thus, each member of the screening team was actively involved with the screening,

the case monitoring, and health education for a child or family.

A summary of the evolution of the medical screening process is included in Figure 4.3. This represents modifications to the EPSDT project over three years as well as two years following the termination of the demonstration when the screening was integrated into the CAHS school health program. Modifications represent (1) refinement of the screening procedures and referral criteria to eliminate false positives and false negatives; (2) efforts at cost containment through efficient utilization of personnel, elimination of low yield screening procedures, and unnecessary referrals including false positives; (3) efforts at standardizing screening and referral procedures to insure quality; and (4) to increase job satisfaction of screening personnel.

New Directions in Screening and School Health

As the project moved into the third year, the Project Director and the CAHS Medical Director began to anticipate the termination of the screening demonstration and to ponder the consequences for the health care of the Checkerboard school children. One fact was obvious: termination would mean a sharp reduction in health services and a high probability that the health status of the children would return to the "pre-EPSDT" state. There was firm agreement that these results could be countered by utilization of lessons learned from the demonstration. These were basically two: the first was that planning and coordination in the use of existing CAHS resources was essential for the remediation or resolution of problems found in screening; the second was that the design of future screening, including the composition of the screening battery, staffing of the screening team, the conduct of screening, and follow-up could all be easily modeled after the lessons learned on the EPSDT project.

A series of discussions and planning meetings were held to find ways of

closer integration of medical screening with CAHS resources, including the school health programs. At the outset, the intent was to create an ongoing program of both medical and developmental screening. Additional funds of a modest amount were obtained through a Health for Underserved Areas Grant to continue medical screening; however, developmental screening and treatment had to be omitted after an intensive and widespread search for funds proved fruitless.

Three general goals and several objectives were established for the newly integrated screening and school health programs. These were:

Goal 1. Maintenance of health and prevention of disease through education and immunization. Objectives under this goal were:

a. to provide schools, teachers, and patients with health education materials;

b. to provide teachers with training and guidance in health and safety education;

c. to provide health counseling to parents and children;

d. to fully immunize all school children, and;

e. to control communicable disease by treatment and proper reporting of cases.

Goal 2. Reduction of chronic and reversible health problems by screening, diagnosis, and treatment. Specific objectives were:

a. to identify health problems via screening; and,

b. to assure treatment of these problems via follow-up and case monitoring.

Goal 3. Provision of limited (non-specific) and emergency care. This goal entailed two specific objectives:

a. to provide care for acute and chronic conditions; and,

b. to provide care for emergency conditions.

To achieve these goals and objectives, the new program was put into place

at the termination of the EPSDT demonstration. The program called for carefully planned and coordinated utilization of the CAHS clinics, its public health nurses, the schools, and the school health nurses. In addition to these resources, the HURA funds provide a full-time screening team, consisting of a records technician, a screening aide, an audiometric technician, a licensed practical nurse, and a registered nurse who serves as a team leader. The principal feature of the new program using these resources may be outlined as follows:

Medical Direction and Supervision: Past experience had indicated the necessity of providing a single focus for the operation and management of the project under the direction and supervision of the CAHS Medical Director.

Planning, Coordination and Training: The experience gained from the project indicated the imperativeness of these three activities to assure full and effective use of the limited resources. Thus, two hours per week are regularly scheduled for these activities. Every second week this time is spent in planning, coordination and a review of all service activities and follow-up. On alternate weeks, this time is devoted to in-service training.

The Screening Battery: The new screening program included vision, hearing, height and weight, blood pressure, temperature, urinalysis, and a physical examination conducted by a physician's assistant or nurse practitioner. This general physical examination includes a newly designed and standardized orthopedic screen and check for trachoma. Although the rate of positive findings by urine screens was only 1.3% in the EPSDT demonstration, the seriousness of the conditions found indicated that urinalysis should be retained. The screening procedure was modified as follows: any child showing protenuria on screen is asked to drink several glasses of water and a test for specific gravity made on a new sample. Only if proteinuria persists in a urine specimen with a specific gravity

of less than .015 is a child referred for examination by a physician. This procedure has reduced the rate of false positive referrals. Responsibility for immunizations is in the hands of the school nurse, who may be assisted by members of the screening team during school-wide immunizations.

As already noted, screening for learning and emotional problems was omitted for lack of funds. The hematocrit and tuberculin testing were also deleted because of their exceptionally low yield.[4] The obvious and great need for dental care precluded dental screening by non-dental professionals.

Referral: One lesson learned from the EPSDT program was the necessity of careful selection of criteria for referral and proper preparation of children in advance of clinic visits. As for referral criteria, a "decision tree"[5] has been developed for each screening step. Included in these algorithms for the handling of abnormal findings are further steps to reduce false positive referrals, subsequent activities required for follow-up and identification of the children whose charts are to be flagged to indicate "high risk". The decision trees are followed by the screening team as well as all school and public health nurses.

Diagnosis and Treatment: Most conditions detected and not treated on-site are referred initially to the CAHS. Minor and acute conditions such as minor wounds, skin lesions, head lice, respiratory conditions, etc., are treated under standing orders.

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[4]The rate of anemia (hematocrit less than 35%) during two years of screening by the demonstration project was 0.66%. Only one child had a hematocrit below 33%. The rate of "unknown" tuberculin positivity was 0.58% (10 children). Seven of these children were found subsequently to be known to CAHS. The Communicable Disease Section of the New Mexico State Health Agency concurred with the decision to delete tuberculin testing.

[5]Request copies of the CAHS School Screening Decision Trees from Richard Kozoll, M.D., MPH, Medical Director, CAHS, P.O. Box 638, Cuba, New Mexico 87013.

Follow-up and Case Monitoring: Follow-up is a joint responsibility of the screening team leader, the school nurses, and the CAHS public health nurses. The team leader maintains a register of all children in need of diagnostic and treatment attention and is responsible for ensuring the provision of that care. Follow-up activities frequently include the provision of transportation to get children to CAHS clinics or to medical facilities in Albuquerque or elsewhere.

Communicable Diseases: To maintain a standardized approach to surveillance over communicable disease, all cases, and contacts, of measles, salmonella, shigella, diphtheria, typhoid, venereal disease, food poisoning and hepatitis are treated, referred and/or reported as required.

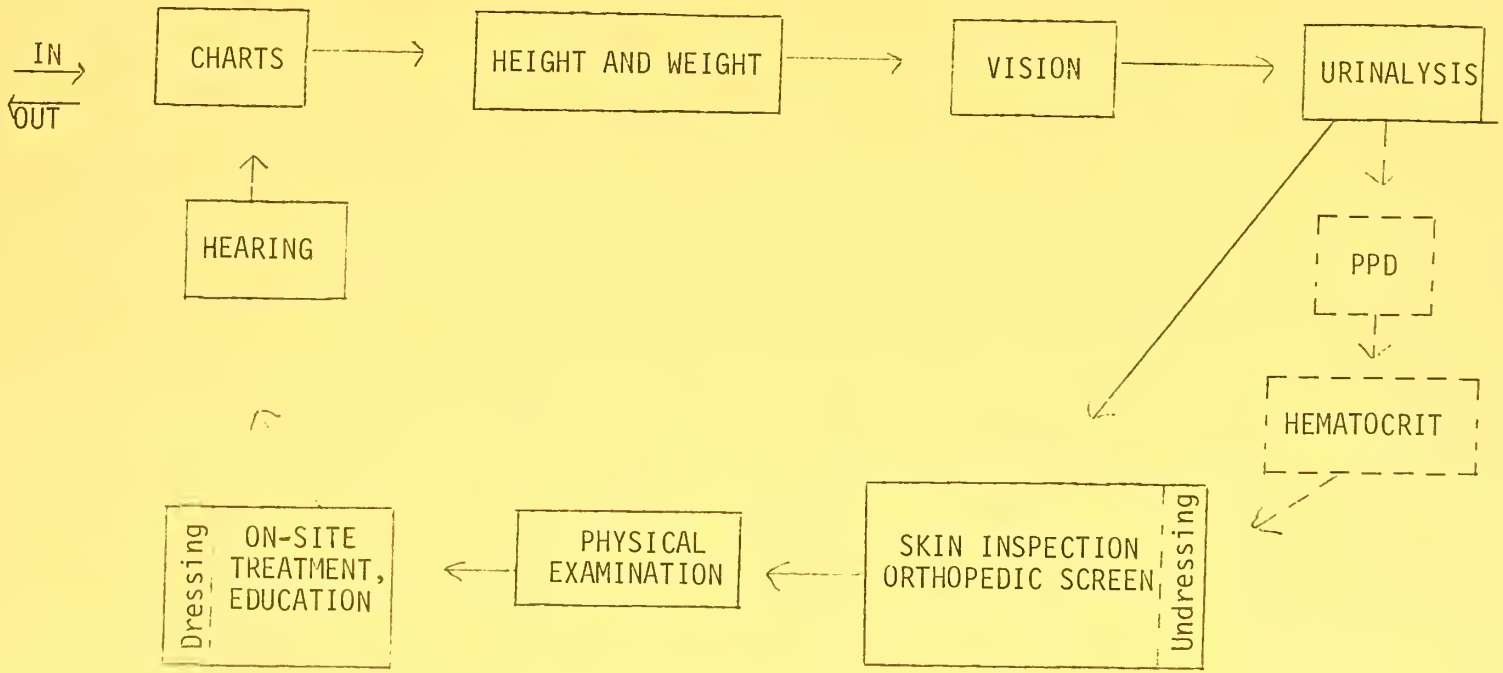
Health Education: As part of its preventive effort, the new program offers health counseling to teachers, students, and parents, if requested. A Health Education Materials center is housed at the CAHS Cuba facility. The materials provided by this center are available to teachers, parents and the public. Special pamphlets in two languages have been prepared by the staff.

Workshops for teachers and school administrators are held periodically to keep them informed about the program and to provide knowledge and training on such topics as first aid, nutrition, dental hygiene, safety, and other health topics. A curriculum guide for health education instruction by teachers and school nurses, now in draft form, is in use in the schools. The guide, developed by a nurse completing a Masters of Public Health Degree in health education, was designed with the specific problems of the Checkerboard in mind. Time for health education is now added to the screening program so that screeners can discuss opportune health topics with children as they move through the screening process.

A second spin-off of the demonstration has important implications for the entire state of New Mexico. The Project Coordinator, (Sally Davis), upon termination of the demonstration project, joined the Department of Pediatrics of the University of New Mexico School of Medicine to develop a comprehensive statewide school health program. Many of the concepts and practical lessons derived from the Checkerboard demonstration are being incorporated into the program. Linkage has been established with the New Mexico Department of Education, the New Mexico Pediatric Society, the New Mexico Health Agency, the Office of the Governor, and other departments within the University. Components of the program include screening, health education, services for the special child, continuing education for school nurses, training of school health technicians, a school health bulletin, sports health and safety, an epidemiological approach to health protection, studies and prevention of the antecedents of adult disease, and a self-care unit for students.

In an effort to overcome the problems created by shortages in health manpower, lack of transportation, and poverty, the Checkerboard experience demonstrated the feasibility of utilizing the schools as a place to impact upon health in a rural state.

Figure 4.1. Screening Flow Chart Including Modification for New School Screening Program



– – – – Indicates steps omitted for the new school screening program

Figure 4.2

Manpower Utilization Medical Screening Team
Changing Responsibilities 1974-77

	1974-75*	1975-76	1976-77	(New School Screening Program) 1977-78
Nurse Practitioner	Pediatric Nurse Practitioner (1) (full-time) 1. supervise medical screening and follow-up 2. train screening team 3. conduct physical exam 4. coordinate activities with clinic, schools, and project development component 5. scheduling 6. on-site treatment	No Change	Family Nurse Practitioner (1) (quarter-time) 1. physical examination 2. on-site treatment under M.D.'s standing orders	No Nurse Practitioner
Registered Nurse	No Registered Nurse	Registered Nurse (1) (full-time) 1. assist P.N.P. 2. P.P.D. 3. follow-up	Registered Nurse (1) (full-time) 1. supervise medical screening 2. training 3. orthopedic examination, temperatures, blood pressure 4. follow-up 5. scheduling 6. coordination with schools, clinics, etc.	Registered Nurse (1) (full-time) 1. supervise medical screening 2. training 3. integrated physical and orthopedic examinations 4. health education 5. follow-up 6. scheduling 7. coordination with schools, clinics, etc. 8. assist with specialty clinics
Licensed Practical Nurse	Licensed Practical Nurse (1) (full-time) 1. P.P.D. 2. hematocrit 3. records 4. follow-up	Licensed Practical Nurse (1) (part-time) 1. P.P.D. 2. hematocrit 3. follow-up 4. temperatures 5. blood pressure	Licensed Practical Nurse (1) (part-time) 1. charting for F.N.P. 2. education 3. treatment on-site under M.D. standing orders, with direction of F.P.N. 4. follow-up	Licensed Practical Nurse (1) (part-time) 1. integrated physical and orthopedic examinations under R.N. supervision 2. health education 3. treatment on-site under M.D. standing orders with direction of R.N.
Audiometric Technician	No Audiometric Technician	Audiometric Technician (1) (full-time) 1. hearing screening 2. follow-up of hearing problems 3. assist ENT clinic	Audiometric Technician (1) (full-time) 1. hearing screening 2. follow-up of hearing problems 3. assist ENT clinic	Audiometric Technician (1) (full-time) 1. hearing screening 2. follow-up of hearing problems 3. assist ENT clinic
Screening Aide	Screening Aides (3) (full-time) 1. shared with developmental component 2. Vision, height and weight, urinalysis records 3. follow-up	Screening Aides (3) (full-time) 1. shared with developmental component 2. Vision, urinalysis, height and weight 3. follow-up	Screening Aides (1) (full-time) (2) (part-time) 1. Vision, urinalysis, height and weight 2. follow-up 3. Recording for hearing screen	Screening Aides (1) (full-time) 1. Vision, urinalysis, height and weight 2. follow-up 3. data collection
Data Technician	No Data Technician	Data Technician (1) (full-time) 1. charts 2. permission 3. data records flow	Data Technician (1) (full-time) 1. charts 2. permission 3. control sheets 4. flow of records	Data Technician (1) (full-time) 1. charts 2. permission 3. control sheets 4. flow of records 5. data collection
Other Assistance	Dental Technician employed by Checkerboard Area Health System--dental screening and education	Physician Assistants from CAHS medical staff--assisted with physical Volunteers assisted with vision screening	School Nurses assisted with screening and follow-up, as needed	School Nurse L.P.N. or R.N. 1. integrated physical and orthopedic examinations 2. treatment on-site under M.D. standing orders 3. follow-up

*no medical component in 1973-74

Figure 4.3

EVOLUTION OF THE MEDICAL COMPONENT OF THE CHECKERBOARD EPSDT PROJECT DISPLAYING MODIFICATIONS 1973 - 1978

Step	EPSDT 1973-74	EPSDT 1974-75	EPSDT 1975-76	Transition from EPSDT to C.A.H.S. School Screening Program 1976-77	C.A.H.S. School Screening 1977-78
General	Developmental screening only	All medical screening done in schools at the beginning of the school year. Developmental screening spread over year.	Medical and developmental integrated in time and feedback; spaced over three week cycle spread over entire school year.	Developmental funding terminated; medical screening funded by HURA combined with school health program sponsored by Checkerboard Area Health System.	Health education integrated into school screening; further refinement of referral and diagnostic procedures of C.A.H.S.
Records	Developmental record system*	No one person responsible for medical records; poorly organized.	Data technician organized and kept record system; accuracy increased.	Data technician continued highly organized record system of charts and control sheets.	Conversion to manual data system utilizing McBee Cards.
Height and Weight	None	No standardized procedure for measuring; high false positive rate with 3rd percentile referral criteria.	Standardized procedure for measuring; study initiated on low height and weight rate and referrals.	New criteria for referral for low height and weight based on N.C.H.S. growth charts.	Decision tree for handling abnormal findings-addition if mid-parental height tables and growth velocity charts to increase specificity and sensitivity.
Urinalysis	None	Follow-up difficult.	Study of abnormal finding rate and referrals initiated. High rate false-positives; follow-up difficult.	Use of specific gravity determination to eliminate false positive; referrals for proteinuria.	Decision tree for handling abnormal findings-use of specific gravity determination to eliminate false positive referrals for ketonuria.
Vision	None	High rate false positives; initiation of rescreening before referral; increased training of aides.	Used plus-lens for hyperopia screening in addition for Snellen A chart; high rate of false positives due to inaccurate usage; study of abnormal finding rate and referrals initiated.	Decision to try viewer-type test and have more in-service with optometrist. Return to Snellen chart.	Decision tree for handling abnormal findings.
T.B.	None	Used Tine test because they were available; changed to PPDV as soon as possible by Mantoux Method.	PPD's done	Discontinued due to low rate of positive findings (positives already known because of good ease and contact treatment program of CAHS.	
Hematocrit	None	Machine could only spin 6-8 tubes; drew one tube per child but some broke.	New machine spins 24; collected 2 tubes in case of breaks.	Discontinued due to low rate of findings.	
Physical Exam General	None	Children often had to be examined with clothes on because of lack of privacy.	Started using privacy screens so child could be undressed.	Training of nurses for physical exams, deletion of lung auscultation abdominal palpation and female genital inspection; expanded on-site treatment under standing orders.	Decision tree for handling abnormal findings.
Heart	None	Could not lay child down. No criteria for referral of auscultatory abnormalities.	Began using cots. High rate of referrals of murmurs which were functional: disturbing to child and parents to bring child to clinic when "nothing wrong". Study of abnormal finding rate and referrals initiated.	School clinics to rule out innocent murmurs held.	Only murmurs referred. Decision tree for handling abnormal findings. Training of nurses to distinguish characteristics of murmurs.
Trachoma	None	No criteria for treatment/referral.	Inservice training on trachoma recognition; trachoma over-referred often confused with conjunctivitis.	Criteria for trachoma treatment/ referral developed on-site treatment covered by standing orders.	- - -
Hair, skin, eyes	None	No criteria for diagnosis	Children referred to school nurse for follow-up did not always know outcome; criteria for diagnosis and standing orders for on-site treatment developed.	On-site treatment and education by LPN; treatment of impetigo, conjunctivitis, head lice included special instructions to dorm mothers and teachers.	Decision tree for handling abnormal findings.
Orthopedic	None	Almost impossible because could not undress child, no privacy	Improved with privacy and unclothed inspection but unstandardized exam and criteria for referral.	New 3-minute orthopedic screen conducted by R.N., high yield of positives.	Decision tree for handling abnormal findings.
Hearing	None	Impedance bridge audiometer for those failing screen. Audiometer Technician trained and certified.	Impedance bridge routinely used for all screening.	On-site treatment of suspect serious otitis media with repeat audiometry afterwards.	Decision tree for handling abnormal findings.
Follow-up	None	Did not immediately follow screening; some left up to school nurse with no method for knowing outcome.	Follow-up initiated immediately after screening; much better organized.	Immediate in-house control lists show referrals and outcome, no waiting for data feedback from computer for follow-up. Less follow-up of false positives because of refined screening steps.	Screening supervisor (R.N.) regularly attended C.A.H.S. specialty clinics.

*Well-organized by diagnostician, poor utilization of professional's time.

Indigenous personnel eliminates language and culture barriers in screening and follow-up.

Indigenous paraprofessionals are trained as aides and technicians and share screening responsibilities with the professional staff.

Dental screening yielded the highest rate of abnormal findings with 29.6% of 2,308 children referred for dental problems.

Physician extenders, such as this pediatric nurse practitioner, conduct physical examinations, and make referrals for diagnosis and treatment.

Children enrolled in the headstart through third grade were the target population.

Ninety-five percent of the roads are unpaved.

Four wheel drive vehicles are sometimes required for travel over the roads.

The EPSDT team travels to the schools to conduct screening.

Washes and arroyos remain dry except during thaws from heavy snows and flash floods.

This service station is a welcome sight for travelers in this sparsely populated region.

Hogans, adobe houses, and trailers are common dwellings in the Checkerboard area

Water from wells such as this must be hauled to area homes.

CHAPTER FIVE

MEDICAL SCREENING AND TREATMENT FINDINGS

Medical screening was conducted in the schools over two full school years: 1974-1975 and 1975-1976. A total of 1,824 children received original screens (1,661 full screens and 163 partial screens) and, of this number, 561 received a rescreen (539 full and 22 partial screens), as shown below.

Medical Screening

	Total Number of Children Receiving			
	Initial Screens		Periodic Screens	
School Year (Sept-Aug)	Full*	Partial	Full	Partial
1973-1974	14	0	0	0
1974-1975	1,215	80	32	0
1975-1976	432	23	508	22
Total	1,661	163	540	22

*A full screen included a physical examination and two or more of the following procedures: A test for trachoma (endemic among the Navajo in the area), hematocrit, urinalysis, a test for tuberculosis, vision and hearing, and a dental check. A partial screen omitted three or more of these procedures. Most of the partials were children who had only a dental check.

Medical screening was also generally restricted to kindergarten through grade three, but older children were given more medical than developmental screens. This came about principally for two reasons: in the smaller schools all children were screened regardless of grade; and, secondly there were more special requests for medical than for developmental screens for children above grade three. The majority of the children (80%) were between ages four and ten. The average age was eight years (S.D., 3 years). Ethnically, the children were 47% Navajo, 34% Spanish, 11% Anglo and 11% other.

The screening in the 1975-76 school year represents an 81.9% participation rate[1] of children enrolled in school during that year. Although parental permission to screen was obtained, it was not possible for most parents to be present at the time of screening. Thus, the desire for a child history and the presence of a parent at the screening was traded for the opportunity to screen more children. Histories were obtained, however, when necessary for diagnostic or other reasons. Many persons argue the importance of the health history in screening; however, many new and serious problems were found without the health histories.

Variation in participation rate among schools ranged from 79.4% to 100%. This was accounted for by three factors:

1. Permission forms were not received because some parents did not return them or because some teachers failed to encourage the children to return the forms or refused to handle the forms at all.
2. At times screening conflicted with school activities, even though screening was scheduled in advance.
3. Absences from school during bad weather also resulted in some children not being screened.

These factors are mentioned because it is commonly assumed that all children will receive necessary medical attention if screening is conducted within schools. This does not necessarily follow. The Checkerboard project found that it had to allocate sufficient staff time to coordinate screening with school activities, make home visits, follow up children in need of diagnosis and treatment, and to collect and record data.

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[1]Participation rate: The number screened (original or periodic screens) divided by the number enrolled in the target group. The 1975-76 school year was chosen because enrollment statistics were more accurately collected and the medical screening was in full implementation.

Screening Findings

The medical findings are reported in several ways to give a relatively complete picture of the results of the screening. The reported results include the rate of positive findings by screening procedure, a description of conditions referred to treatment sources, the treatment history and the seriousness of conditions reaching treatment, and the chronicity of conditions reaching treatment. The report then turns to a discussion of factors related to rate of positive findings, diagnosis and treatment, follow-up and immunization status.

Rates of Positive Findings[2]

Over 1,661 children were medically screened. The physical examination yielded, as Table 5.1 shows, 792 positive findings, 558 other screening procedures, and 548 dental screenings, for a total of 1,898 positive findings, or approximately 1.14 findings per child screened. Of the total problems, the physical examination produced 42%, the dental examination produced 29%, the vision test produced 17%, and the hearing test produced 7.3%; this accounts for some 95% of the findings. Conditions related to the eyes, ears, nose and throat accounted for 64% of the problems found by the physical examination. The tests for hearing also accounted for most (83.4%) of the findings by other medical screening steps.

The yield from other parts of the physical examination and other screening steps can be found in Table 5.1. The results from the periodic screens given in the second year, which will be compared with findings on original screens, are also listed. Before doing that, however, we examine additional features of the findings to provide a somewhat more complete description of the problems found.

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[2]A positive finding occurs when a screening procedure detects evidence suggesting the presence of symptoms, malfunction, etc.

Table 5.1

Positive Findings for Original and Periodic Medical Screens
September 1974 - May 1976*

	Original			Periodic		
	(1)	(2)	(3)	(4)	(5)	(6)
Screening Procedure	Number Screened	Number Positive	Percent Positive	Number Screened	Number Positive	Percent Positive
A. Physical Examination						
Ears**	1,661	233	14.0	540	29	5.3
Eyes	1,661	139	8.4	540	36	6.7
Nose & Throat	1,661	136	8.2	540	26	4.8
Skin	1,661	44	2.7	540	34	6.3
Heart	1,661	106	6.4	540	78	14.4
Respiration	1,661	8	0.5	540	0	0
Orthopedic	1,661	23	1.4	540	3	0.5
Other physical	1,661	36	2.2	540	6	1.1
Trachoma	1,661	67	4.0	540	7	1.3
Total Full Physical	1,661	792	47.7	540	219	40.6
B. Other Medical Procedures						
Hematocrit	1,582	13	0.8	528	5	0.9
Urinalysis	1,686	79	4.7	539	24	4.5
T.B. (P.P.D.)	1,614	9	0.6	455	0	0
Hearing	1,237	138	11.2	557	57	10.2
Vision	1,618	319	19.7	587	102	17.4
Total Other		558	***		188	
C. Dental Screens	1,693	548	32.4	559	148	26.5

*Includes 14 medical screens conducted in 1973.

**Problems with ear, eye, hearing, vision, and trachoma are given according to source of identification, and are independent counts; vision problems are primarily refractive conditions.

***No total here since N varies by procedure.

These features include examples of the written description of the problems as recorded by members of the screening team: the history of the problems, i.e., whether previously diagnosed and treated; the degree of seriousness of the conditions, as judged by the physician treating the problems; whether the condition was chronic or acute; and the health status of all children screened.

Problem Descriptions

The document used by the screening team to refer children required a brief written description of the conditions for which on-site treatment was not feasible. A more immediate sense of what the problems were is captured in the descriptions given on the referral form. These included: "obesity", "thyroid enlargement", "underweight", "strabismus", "foreign body in the ear", "hearing loss", "abscessed upper incisor", "tender liver", "glomerulonephritis", "undescended testicle", "curvature of the spine", "hematuria", "enuresis", "caries", "refractive error", "abnormal audiogram", "trachoma", and "systolic murmur". A detailed listing of the problems is given in Appendix C.

Newness of the Problems Found

Did the screening simply detect and document problems already known and under care? Treatment histories were obtained from the parents, teachers, or CAHS clinics for 534 of the 1,538 problems referred. Of these 534 problems, 69% were new, 15% were already known but not under care, and 16% were known and under care. Thus, the screening did not simply rediscover problems already under care; and finding those that were known but not under care (15%) was useful in bringing these children to needed treatment.

Seriousness of Problems Referred

Each professional who saw children in the CAHS clinics on referral from the

screening team was asked to rate the seriousness of each condition on a five-point scale, ranging from mild to severe. The purpose was to obtain some estimate of the severity of the problems uncovered by screening. These ratings were obtained for 597 conditions which were collapsed into three categories: mild, moderate, and severe,[3] as shown in Table 5.2.

The anemia cases referred were borderline; therefore, all were rated as mild. The ear, hearing, and dental problems were the categories most often rated severe. Severe ratings for ear and hearing problems meant that the child had difficulty hearing loud speech (50 to 110 decibel loss) and needed surgery, hearing aids, speech therapy, or auditory training. There were 30 children who received tympanoplasties (skin grafts to rebuild the eardrum), which indicates the extent and severity of chronic hearing conditions in this population. The number of mild conditions found gives hope that screening may offer an opportunity to ameliorate these conditions prior to their becoming severe and chronic, thus eliminating many costly surgery cases (tympanoplasties were $1,000 per ear at this time).

The following table gives the seriousness ratings of problems by their history; that is, whether a condition was previously known, and if known, whether it was currently under care. Known problems, whether under care or not, were more often rated moderate or severe than were new ones. Problems which were known but not under care, primarily dental conditions, were rated severe more than twice as often as were other problems. Half of the new problems were rated moderate or severe, with 16% being severe.

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[3]Five-point scale ratings broke down as follows: 1 - 2 = mild; 3 = moderate; and 4 - 5 = severe.

Table 5.2

Seriousness of Referred Problems as Rated by Physicians Diagnosing and Treating Each Condition, Number and Percent

Type Condition	Number Rated	Mild	Moderate	Severe
Dental	225	24%	39%	37%
Heart Murmur	110	88%	11%	1%
Vision	127	21%	71%	8%
Measurements (Height, Weight)	15	100%	0%	0%
Hearing/Ear	80	45%	31%	24%
Anemia	4	100%	0%	0%
Warts	6	67%	0%	33%
Orthopedic	3	33%	33%	34%
Hematuria	8	75%	13%	12%
Skin	5	80%	20%	0%
Other	14	50%	43%	7%
TOTAL	597	43%	37%	20%

Seriousness Ratings of Diagnosed Problems (Percent)

Problem History	Number	Seriousness Rating		
		Mild	Moderate	Severe
Not known (new)	296	49.0%	35.1%	15.9%
Known: Not under care	76	32.8%	31.6%	35.6%
Known: Under care	64	35.9%	50.0%	14.1%
Total	436	44.3%	36.7%	19.0%

Table 5.3 gives the rate of moderate to severe problems per 1,000 screens which were brought to diagnosis and treatment. Dental conditions provided the highest rate, with 75 per 1,000 screens. Problems associated with the eyes rated second highest, with 40 per 1,000 screens. The third highest rating was for problems associated with the ears, with 12 per 1,000 screens.

Chronicity

As with seriousness, each practitioner to whom a child was referred was asked to state whether, in his opinion, the problem should be considered as a chronic or an acute condition. In total, 87% of the problems referred were considered chronic. In the problem categories of dental, vision, ear and hearing, heart, and other, over 75% of the problems diagnosed were judged to be chronic.

Healthiness Rating

What was the general health status of the Checkerboard target population? Measurement of health status is a complex task which has no easy solution. Nevertheless, we made an effort to obtain an assessment of the children's health by having the pediatric nurse practitioner who performed most of the physical

Table 5.3

Previously Untreated Conditions Judged
Moderate to Severe Per 1000 Screens

Conditon	Diagnosed	Moderate/Severe Conditions Not Previously Under Care	Rate per 1,000 Screens
Dental	322	163	74.57
Vision	172	89	40.71
Heart Murmur	134	13	5.95
Hearing/Ear	90	27	12.35
Other*	30	5	2.29
Hematuria	10	2	0.91
Warts	7	2	0.91
Skin	7	1	0.46
Orthopedic	5	1	0.46
Total	788	303**	138.61

*T.B., thyroid, learning disability, enuresis, undescended testicle, tender liver.

**Represents 37% of conditions reaching diagnosis and 21% of conditions referred.

examinations make a judgement about the health of each child. To do this, she made a rating on a nine-point scale, ranging from a score of one, representing a life-threatening condition, to a score of nine, representing a child in the "picture of health"--able to learn, play and perceive.[4] Only six of the 1,610 children rated were given a score of four or less. The remainder were distributed over the last five scale values as follows:

Scale Description	Scale Score	Number	Percent*
Has Problem(s): Needs extensive treatment- or Change of life condition-	5 or 6	59 257	3.7 16.0
Has Problem(s): Requiring one-time treatment- or Minor self-limiting condition-	7 or 8	479 576	29.8 35.8
"Picture of Health": Able to learn, play, perceive-	9	233	14.5

*Percentages based on N of 1,610.

In the judgement of the pediatric nurse practitioner, one-fifth (19.7%) of the children screened required serious medical attention and/or a change in life conditions to improve their health; two-thirds (65.6%) were in need of treatment for conditions such as respiratory infection, head lice, small wounds, eyeglasses, etc., and one-sixth (14.5%) were given a clean bill of health, i.e.,

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[4]The ratings of two, three, and four on the scale were designated "very unhealthy" and "moderately unhealthy". The descriptions of ratings five through nine are given in the table in the text following.

were rated as "pictures of health". Thus, according to this rating, the screening detected some problems in 85% of the children, and one out of five of them (20%) were judged as relatively serious.

Factors Affecting Rates of Positive Findings

Many variables affect the rate of positive screening findings. These may include the age of the children, their ethnicity, the season of the year, the knowledge and skill of the person conducting the screening, the tests used, the screening environment, and whether the screen is an original or periodic one. These factors are discussed in the following sections as they interact with other variables. A multiple linear discriminant function analysis was performed (available upon request) to determine those variables which, in their own unique way, influenced the determination of a positive finding for any screening procedure. The analysis showed that, in general, and other things being equal, children of ages four, five, and six had the greatest rate of positive findings and that children in the village of Cuba had the lowest rate of findings. In addition, for certain screening procedures the rates of findings differed by sex, ethnicity, year of screening, and periodicity.

Ethnic Differences

The following table indicates the number of children screened for trachoma, vision, hearing, and dental problems, and the percentage of positives on each screening procedure by ethnicity. The rate of positive findings for the Navajos equaled or exceeded that of other groups for all but trachoma and dental conditions. Trachoma rates ranged from 2.7% for the Anglos, to 11% for the "other"

children. Dental problems ranged from 40% among the Spanish, to 25% among the Anglos.

Findings on Selected Procedures by Ethnicity
(Original Screens)

	Navajo		Spanish		Anglo		Other	
Procedure	N*	Percent Positive	N	Percent Positive	N	Percent Positive	N	Percent Positive
Hearing	793	10.5%	499	6.4	178	6.3%	27	7.4%
Vision	724	23.2%	527	16.9%	193	13.0%	29	24.1%
Dental	790	32.6%	582	39.3%	206	25.3%	29	31.0%
Trachoma	784	4.3%	569	3.6%	182	2.7%	27	11.1%

*Number screened

Age Differences

Age differences were most marked for nose and throat, skin, hematocrit, urinalysis, vision, and dental findings. The age at which rates were highest varied with each procedure. Appendix D shows the differing age pattern for those screening steps and also gives the percent of positive findings by single years of age for six problems: nose and throat; skin; anemia; urine; vision; and dental. Nose and throat conditions were highest (20%) among six-year-olds. Skin conditions were more prevalent among five and six-year-olds (4%), as were vision problems (25%). Dental problems were found in 51% of the four-year-olds and were present in up to 40% of the five through seven-year-olds. Among children 15 years of age and older who received a dental screen only, the rate of finding was 81%. The urinalysis and hematocrit detected no problems in children four through eight years of age.

Sex Differences

The only procedure producing different rates by sex was vision screening: of the 560 boys screened, 15.4% were positive; while 23% of the 583 girls were positive. Perhaps it should be emphasized that findings by urinalysis did not differ by sex.

Staff Differences in Rates of Findings

The following table gives the percentage (rate) of positive findings by type of staff for selected screening during the first full year of screening. Only the first year is reported since most of the initial screens were given in that year. On the screen for hearing, the rates of finding ranged from 0% for the PNP to 17% for the LPN; vision screen findings ranged from 9% for volunteers to 29% for registered nurses, and dental[5] screen findings ranged from 25% for the PNP to 80% for registered nurses. Such differences indicate a need for careful monitoring of rates of findings by each staff person, supervisory review, and guidance in the course of screening.

[5]Since volunteers and screening assistants screened fewer than 5 children each for dental conditions, they are not considered here.

Rates of Findings by Different Staff
During the First Year of Medical Screening (74-75)
On Hearing, Vision, and Dental Screens

Staff Member	Hearing		Vision		Dental	
	N*	Percent Positive	N	Percent Positive	N	Percent Positive
Pediatric Nurse Practitioner	34	0.0%	67	17.9%	942	64.9%
Registered Nurse	138	11.5%	209	29.2%	124	80.6%
Licensed Practical Nurse	58	17.3%	10	20.0%	41	41.5%
Volunteer from Local Community	--	--	173	9.2%	3	8.0%
Screening Assistant	902	6.5%	681	18.9%	4	75.0%
Dental Hygienist	--	--	--	--	77	64.9%

*Number of original screens.

Original Versus Periodic Screens

A fundamental feature of the EPSDT program is the requirement that screening be done periodically. Although no pattern of periodicity has been specified as yet[6], questions are sometimes raised about differences in rates of findings between original and periodic screens. If follow-up and treatment are provided, should rates on subsequent (periodic) screens be lower than those on original screens? Another question asked at times is: How many children have the same problem(s) on subsequent screens? Such questions are not easily answered.

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[6] The American Academy of Pediatrics, in a document prepared for SRS, under contract, calls for 12 screens over the first 12 years of life, with 6 of these occurring during the first year. See W.K. Frankenburg and A.F. North, Jr., A Guide to Screening for the Early and Periodic Screening, Diagnosis and Treatment Program under Medicaid (Washington, D.C.: DHEW Social and Rehabilitation Service, 1974), pp. 53-59.

Chronic conditions will persist by definition. Some acute conditions may occur repeatedly and be present on subsequent screens, and new conditions can appear between screens. Precise comparison can also be made difficult by changes in the general quality of the screening or by specific improvements in some features of the screening between original and periodic screens. In spite of such difficulties, we examined results between original and periodic screens, as shown in Table 5.4.

Column 2 of Table 5.4 gives the percentage of positive findings for the 508 children screened in 1974-75, and column 4 gives the percentage of positive findings for the same children on a periodic screen in 1975-76. Column 3 of the same table gives the percentage of positive findings for the 508 children for the first time in 1975-76. Columns 2 and 4 allow comparison between original and periodic screens for the same children. Of the 15 different comparisons, marked differences occurred on only two: the rate of positive findings associated with examination of the ears was about five times greater on original screens than on the periodic; and heart findings were reversed on the two screens but were of the same general magnitude. For the remainder of the comparisons, no clear pattern emerged between periodic and original screens. Columns 3 and 4 allow comparison of findings for children screened for the first time in 1975-76 and those having a periodic screen in the same year. Such a comparison tends to eliminate any differences which might arise from changes in screening procedures between screening periods[7]. As can be seen, the findings for ears and heart were quite

[7]It can happen that children receiving periodic screens in a given year are older than those receiving a screen for the first time and, thus, influence the rate of findings. In this particular comparison (Columns 3 and 4, Table 5.4), age adjusted rates made only one change in the rates: the percentage positive on original dental screens (Column 3) rose from 24.4% to 27.7%.

Table 5.4

Comparisons of the rates of positive findings on Original and Periodic Screens

Screen Procedures	(1) Original Screens		(2) Original Screen results (74-75) for those having periodics in 75-76		(3) Original Screens 75-76		(4) Periodic Screens 75-76	
	N	% pos.	N	% pos.	N	% pos.	N	% pos.
Ears	1215	17.8%	508	16.5%	432	3.2%	508	3.7%
Eyes	1215	8.4%	508	9.5%	432	7.2%	508	6.5%
Nose and Throat	1215	9.7%	508	10.2%	432	3.2%	508	4.7%
Skin	1215	2.4%	508	2.0%	432	3.5%	508	6.5%
Heart	1215	4.5%	508	5.7%	432	22.6%	508	25.2%
Respiration	1215	0.5%	508	0.4%	432	0.5%	508	0.0%
Orthopedic	1215	0.9%	508	0.7%	432	2.8%	508	0.6%
Other physical	1215	1.5%	508	2.0%	432	2.6%	508	1.2%
Trachoma	1261	4.4%	527	3.2%	412	2.9%	490	4.3%
Hematocrit	1145	0.4%	478	0.4%	428	2.9%	504	1.0%
Urinalysis	1174	4.6%	490	3.8%	427	5.9%	508	4.5%
T.B.	925	1.0%	387	0.0%	305	0.0%	434	0.0%
Hearing	1146	8.1%	480	8.4%	458	9.6%	532	9.6%
Vision	1151	19.1%	481	20.8%	442	22.2%	562	17.4%
Dental	1239	33.2%	518	30.5%	454	24.4%*	529	30.0%

*This percent is 27.7% when age-adjusted to ages of children screened in 1974-75.

similar, and the periodic rates occurred above and below those of the children screened the first time with near equal frequency.

These gross comparisons, thus, do not indicate any general improvement in the health of the children between their original and periodic screens. To take a somewhat more precise look at what took place between the original and periodic screens, the records of 50 children with positive hearing findings on the periodic screen (and whose original screens could be matched) were examined. Of the 50 with hearing findings, only 12 (24%) were positive for hearing on their original screen. Similarly, only 41% of the 100 children with positive vision findings on the periodic screen were also positive on the original screen. As children develop, new problems may emerge; therefore, screens after a one-year period may not show large differences in the overall rate of positive findings, although the particular types of problems may be different.

Diagnosis and Treatment

If a screening program is to have a significant impact on the health of children, the program must ensure that conditions found by the screening receive adequate treatment. In the case of this project, case management[8] activities to accomplish this were initiated and completed for many children on the screening site; for others, a long-term process was required. The process began with reports to teachers, school nurse, and parents to assure that necessary actions would be taken to result in treatment. Feedback to the teachers at each school was given following the conclusion of screening, and findings were conveyed to parents by letter and/or home visits, depending upon the circumstances in each case. Parental permission for treatment was obtained

[8]Case management is actions and procedures taken to get children to diagnosis and treatment, including the full course of necessary treatment. In the case of this project, case management included health education as a part of follow-up.

and arrangements for treatment were worked out with parents.

On-site Diagnosis and Treatment

Of the 1,898 positive findings on original screens in both years (medical and dental), 42.6% of the conditions were handled by a school nurse or the nurse on the screening team under standing orders of a CAHS physician (see Table 5.5). This assured immediate treatment and represented considerable treatment cost savings without extra effort on the part of families and children.

The following table of case management outcomes shows that 727 (50%) of all clinic referrals (including dental) resulted in full resolution of problems referred, including false positives and conditions "cured" or treated. An additional 212 (14.6%) of the conditions were seen at least once by a physician, but the project ended before all treatment outcomes could be determined. These 212 conditions, together with 727 problems brought to full medical resolution, indicate that the case management effort by the project was successful for 64.6% (or 933) of the problems referred to the Checkerboard Area Health System.

Case Management Outcomes

Outcome	Referrals to the School Nurse		Referrals to the CAHS Clinics	
	N	Percent*	N	Percent
Problem brought to full medical resolution	743	73.0	727	50.0
Problem brought under care, treatment not known finished	124	12.2	212	14.6
Status nknown or unsuccessful	151	14.8	514	35.4
Total	1,018	100.0	1,453	100.0

*Based on a sample of 300 referrals to the school nurse.

Table 5.5

Number of Positive Findings by Screening Procedure and Percent Referred by Type of Referral, Total Original Medical Screens

Screening Procedure	N	Referred to CAHS Clinic	Referred to School Nurse For Care	Referred to School Nurse For Retest
A. Physical Examination				
Ears	233	16.7%	82.4%	0.4%
Eyes	139	16.5%	81.3%	2.2%
Nose and Throat	136	2.2%	97.8%	0.0
Skin	44	6.8%	90.9%	2.2%
Heart	106	80.2%	12.3%	7.5%
Respiration	8	12.5%	87.5%	0.0
Orthopedic	23	39.1%	39.1%	21.7%
Other Physical	36	38.9%	47.2%	13.9%
Trachoma	67	25.4%	46.3%	28.3%
B. Other Procedures				
Hematocrit	13	84.6%	15.4%	0.0
Urinalysis	79	10.1%	34.2%	55.7%
T.B. (P.P.D.)	9	77.8%	22.2%	0.0
Hearing	138	59.4%	14.5%	26.1%
Vision	319	80.9%	9.7%	9.4%
Dental	548	96.0%	3.8%	0.2%
Total	1898	57.4%	34.7%	7.9%

Of the 35.4% of the "unknown and unsuccessful" referrals to CAHS, the status of 12.5% was undetermined at the close of the project. Since one purpose of case management is to achieve a definable outcome for all referrals, and sufficient time was available between termination of screening and the close of the project, these unknown cases must be counted as case management failures. Referral action was known to have been unsuccessful on the remaining 22.9%, but a sizable majority (70.6%) of these resulted from unkept appointments. In addition to broken appointments, other failures resulted from moves by families, parental refusal of treatment, etc.

The number of broken appointments requires further explanation. Approximately 89% of these were referrals for caries or other dental work. The CAHS dentist was generally unable to schedule blocks of time when large numbers of children could be seen. It was not possible (within the budget) to transport each child to the clinic for individual appointments. To provide some dental care, the project engaged a pedodontist to work for several months during one summer and fall treating children brought to the clinic in groups. To improve the rate of dental treatment, this method would have had to be continued or some alternative used, e.g., mobile dental units.

School nurse referrals (retests, ensuring receipt of prescribed medication, etc.) were completed 73% of the time, and an additional 12.2% of the referrals were initiated but not completed at the close of the project. The school nurses had not documented whether action had been taken for 14.8% of the children.

The problem referral form initiated by the project provided space for physicians to record the diagnosis and to indicate the treatment provided. The physicians also rated the problem as to whether they saw them as chronic or acute, and whether they were mild, moderate, or severe. CAHS then recorded

charges for diagnosis and treatment on the form and returned it to the project as a billing statement. By this means the project was appraised of the diagnostic treatment and cost status of each problem.

Diagnosis and Treatment Outcomes

There were 1,453 problem referrals recorded on the problem referral sheets during the period of the project's medical screening. These sheets were completed for children needing referral to a medical or dental clinic. Likely, there were more than 1,453 actual referrals, but these were the only ones documented by a problem sheet. The number of referrals for each major type of condition is shown in Table 5.6, along with the number of problems known to have reached diagnosis and the number declared false positive. In total, 68% of the referred problems reached diagnosis. The percentage reaching treatment was lower for dental problems (52%) than for medical problems (83%), as can be seen in Column 3 of Table 5.6. If the abnormal measurement problems are deleted, 87% of the referred medical problems reached treatment.

False positives occurred in approximately 20% of the conditions reaching diagnosis, with the highest percentage (38%) of false positives occurring in vision problems. Part of this high rate resulted from the use of the "plus lens" test for hyperopia in the last year of screening, when 27 of the 33 referrals were false positives.[9] Removal of the plus lens referrals reduced false positives to 29% for vision referrals. With the exception of the plus lens test, the percentage of false positives seems well in line with rates likely to occur in any well-run screening program. Comparison of the rate of false positives

[9]It is not clear whether this is a problem of the screening test or of the diagnostician. A Michigan study of 36,554 children showed that 2% of the population had a refractive condition of hyperopia. The rate of positive plus lens screening referrals in the project was 2.6% (33 ÷ 1246).

Table 5.6

Diagnosis Outcome for 2,186 Full Screens
(Original and Periodics)

Type Condition	(1) Number of problems known referred	(2) Number and percent reaching diagnosis		(4) Number Diagnosed as a problem	(5) Number and percent false positive	
		Number	Percent		Number	Percent
Dental	703	364	52%	322	42	6%
Medical						
Vision and eye*	319	267	84%	172	92	36%
Heart Murmur	166	151	91%	134	17	11%
Hearing and Ear	123	109	89%	90	19	17%
Abnormal Measurements	59	20	34%	16	4	20%
Other**	35	32	91%	30	2	6%
Anemia	13	10	77%	8	2	20%
Hematuria	13	13	100%	10	3	23%
Orthopedic	8	7	88%	5	2	29%
Warts	7	7	100%	7	0	0
Skin	7	7	100%	7	0	0
Total Medical	750	623	83%	479	144	23%
Total Medical and Dental	1453	987	68%	801	186	19%

*Primarily refractive error

**Includes T.B., thyroid, learning disability, throat infection, enuresis, undescended testicle, tender liver.

(as a percent of those conditions reaching diagnosis) fell from 26% to 15% (see Table 5.7) between the school years 1974-75 and 1975-76.

The large increase in the number of heart murmur referrals between year one and year two, along with the reduction in the percentage of false positives raises questions about the definition of false positive and the potential duplicate referrals. The reason for the increased referrals most likely was the additional training received by the pediatric nurse practitioner prior to the second year of screening. The following table shows the seriousness of heart murmurs referred for both years.

Year	Number Referred	Not Rated	Percent: Mild	Moderate	Severe
1974 - 1975	30	66%	20%	7%	7%
1975 - 1976	136	24%	67%	8%	1%

Although the percentage of problems rated moderate to severe was smaller in the second year, the number of children so rated rose from 4 to 11, with no overlap among the 15 children involved. Three children not rated in the first year were rated mild in the second, and one child rated mild in the first year was rated moderate in the second year. The rate per 1,000 children having heart murmurs that were new and moderate or severe rose from 3.2 per 1,000 children screened in 1974-75 to 9.6 per 1,000 in 1975-76 (see Table 5.8).

Changes in the rate of new and moderate to severe conditions reaching diagnosis per 1,000 screened for other conditions in each year are shown in Table 5.8. The increase from 68 to 235 per 1,000 screened indicates improvements in screening and reporting. In this regard, the effect of switching follow-up to immediately after the screening rather than waiting until all screening was completed is seen in Table 5.9. Examination of this table makes it clear that

Table 5.7

Comparison of the Percent False Positives
Between the Two Years of Screening
(Original and Periodic Screens)

Type Condition	1974-1975			1975-1976		
	Number Reaching Diagnosis	Number False Positive	Percent False Positive*	Number Reaching Diagnosis	Number False Positive	Percent False Positive*
Dental	138	35	25.4%	227	7	3.1%
Medical						
Vision and Eye	85	28	32.9%	176	67	38.1%
Heart Murmur	24	9	37.5%	126	8	6.3%
Hearing and Ear	53	12	22.6%	55	7	12.7%
Abnormal Measurements	0	0	--	20	4	20.0%
Other*	18	0	0.0	17	2	11.8%
Anemia	2	0	0.0	8	2	25.0%
Hematuria	3	2	67.0%	10	1	10.0%
Orthopedic	1	0	0.0	6	2	33.3%
Warts	2	0	0.0	5	0	0.0
Skin	4	0	0.0	4	0	0.0
Total Medical	192	51	26.6%	427	93	21.8%
Total Medical and Dental	330	86	26.1%	654	100	15.3%

*Percentage of those reaching diagnosis

Table 5.8

New Conditions Rated Moderate
to Severe per 1,000 Children Screened
(By Year of Screening)

Type Condition*	1974-75	1975-76
Dental	16.8	151.1
Medical		
Vision and Eye	30.4	54.3
Heart Murmur	3.2	9.6
Hearing and ear	12.0	12.7
Other	0.8	4.3
Hematuria	0.8	2.1
Orthopedic	0.8	1.1
Warts	1.6	0.0
Skin	1.8	0.0
Total Medical	51.4	84.1
Total Medical and Dental	68.2	235.2

*No abnormal measurements or anemias were rated moderate or severe

Table 5.9

Number and Percent of Conditions Reaching Diagnosis
(By Year of Screening)

Type Condition	1974-75 No. referred	1974-75 % reaching diagnosis	1975-76 No. referred	1975-76 % reaching diagnosis
Dental	364	38%	339	67%
Medical				
Vision and Eye	109	83%	210	84%
Heart Murmur	30	83%	136	93%
Hearing and Ear	60	88%	63	88%
Abnormal Measurements	0	-	59	34%
Anemia	3	67%	10	80%
Hematuria	3	100%	10	100%
Orthopedic	2	50%	6	100%
Warts	2	100%	7	71%
Skin	4	100%	4	100%
Total Medical	213	76%	505	81%
Total Medical and Dental	577	52%	844	76%

the effort "paid off". The percentage of dental problems reaching diagnosis increased from 38% to 67%. For total problems, the increase was from 52% to 76%. Since there was only a 5% increase in the percent of medical problems reaching diagnosis, it appears that medical conditions seemed more imperative in both years than did dental conditions. On the other hand, given the paucity of dental treatment resources, it may have seemed useless to try to pursue dental referrals. The spacing of referrals, however, eased the impact on the limited dental resources.

Time to Treatment

The time required to get children to treatment is summarized in Table 5.10. Since most of the specialists examining the children in the CAHS Clinic came from Albuquerque and held clinics only once or twice per month, some backlog occurred. The records of the 21 children with infective-parasitic conditions were reviewed to determine the time required for the more serious cases to get to treatment. The more serious (severe trachoma, active TB) were seen within two or three days. The mild conditions (warts, mild trachoma) required upwards to three months. It appears the time between screening and treatment was appropriate for those children who reached treatment.

The statistics presented do not adequately reflect the effort expended and results achieved by the follow-up activity. A case study of a child having a tympanoplasty, included as Appendix E, gives some notion of what could happen.

Resolution of Medical Problems

By the close of the data collection phase of the project, the outcome of treatment (Resolution Status) of 801 problems -- 479 medical and 322 dental -- had been determined. The outcomes are shown in Table 5.11. Three-fourths of

Table 5.10

Time Between Referral and Treatment
for all Problems Referred
CAHS Clinics

Diagnosed Problem	Number	Treatment	Range	Percentage Distribution of Months to Treatment 0*	1	2	3+
Infective**	21	1.92	0-5	33%	52%		14%
Anemia	8	1.20	0-5	63%	25%		12%
Vision (refractive error)	140	2.17	0-5	11%	30%	29%	30%
Eye Problems (disease of the eye)	16	.56	0-2	56%	31%	13%	
Ear and Hearing	76	2.44	0-5	9%	25%	36%	30%
Heart	127	1.45	0-5	51%	35%	2%	12%
Upper Respiratory	6	0.33	0-3	68%	16%	16%	
Dental	302	4.51	0-5	50%	8%	7%	35%
Genitourinary	7	.71	0-2	29%	71%		
Dermatological	4	.25	0-2	75%	25%		
Orthopedic	3	.50	0-4	33%		33%	33%
Enuresis	3	.67	0-2	33%	67%		
Other	13	1.79	0-5	23%	46%	8%	23%
TOTAL	726			38%	22%	13%	27%

*The column "0" indicates treatment in less than one month.

**Includes tuberculosis, trachoma, and other infective or parasitic conditions.

Table 5.11

Resolution Status of Problems Brought Under Care

Type Condition	Number conditions diagnosed	"Cured"	Not "cured" Maximum benefit obtained	Not "cured" Treatment not feasible	Still under treatment	Referred for further treatment
Dental	322	76%	2%	0	21%	1%
Medical						
Vision and Eye	172	74%	19%	1%	4%	2%
Heart murmur	134	10%	52%	9%	14%	15%
Hearing and ear	90	15%	23%	1%	47%	14%
Anemia	9	13%	12%	0%	75%	0%
All Other	75	17%	10%	21%	46%	6%
Total Medical	479	32%	29%	7%	23%	9%
Total Medical and Dental	801	50%	18%	4%	22%	6%

the dental problems had been corrected and a fifth were still under treatment. For medical problems, only 32% had been "cured". Over a fifth (23%) were still under treatment, and about one tenth were in referral status for further treatment. Over one-third (36%) of the conditions were defined as having obtained maximum benefit from treatment with no further remediation possible, or were classified as problems for which treatment was not feasible.

Tympanoplasty Treatment

Thirty children had tympanoplasties performed as a result of the screening. A special study conducted by the project found the hearing of these children to be within normal limits three months after treatment. Of the 30, 15 (88%) of the 17 children who had received a developmental screen were low in use of English.

A total of 94 children with hearing problems were included in the hearing follow-up study, which may be summarized as follows:

30 had received tympanoplasty

21 needed tympanoplasty (two parents refused surgery)

4 had permanent hearing loss

6 were under care and need annual recheck

7 were not seen because of change of residence

11 were not referred after retesting because condition had resolved

15 were rechecked by CAHS ENT Clinic and found in normal limits.

Immunizations

Records of the immunization status of children screened were scattered throughout the schools, the Indian Health Service facilities, CAHS Clinics, and

the home. One staff member worked from six to eight months to assemble the immunizations records of the children in one location. At the time of the initial screens for all years, only 33.4% (632/1891) of the children had records available. Those children whose records were available were 82.5% current for all immunizations (DPT, Polio, Rubella, Measles) for age at the time of screening.

At the initial screen of those children also receiving a periodic re-screening, only 15% (102/646) had records available. The records were available for 72% (466/656) of those screened at the time of periodic screens one year later. The children whose records were checked were shown to be 77% current for all immunizations. The schools and clinics were doing a fair job of immunizing children, but there was no single adequate source of documentation, which suggests a need for centralized immunization records system for school children. In the Checkerboard Area, the responsibility for maintenance of immunizations records of the school children now lies with the school nurse. In communities where records are scattered among the schools, physician offices, public clinics, hospital records, health departments, or in the home, with no central responsibility, many children will likely be overlooked or overimmunized.

Summary of Findings

For the two years of medical screening, the project gave 1,161 full screens, 540 periodic screens, and 185 partial screens, for a total of 1,986 children screened. Although some older children were screened, this total principally represented kindergarten through grade three--80% were between 8 and 10 years of age. In total, the children represented approximately 80% of those targeted for screening. One-third (32.4%) of the children were positive on the dental screen, which accounted for 28.9% of the total problems. Vision and other eye problems accounted for 24% of the problems, and hearing and other problems of the ear accounted for 19.6% of the total. Thus, teeth, eyes, and ears accounted for almost three-fourths (72.5%) of the total problems. Some 600 (597) of the problems were rated as to their severity by the physician seeing the children for diagnosis and/or treatment. Of this number, 57% were judged as moderate to severe.

Based on the results of 1,453 of the problems referred for diagnosis and treatment, one-fifth (19%) of the screening findings were false positives. The lowest rate of false positives, exclusive of dermatological problems (warts and skin), occurred for dental conditions--6%; and the highest false positive rate occurred for findings associated with the eyes--36%. The rate of conditions that were new and also moderate to severe conditions increased from 68 per 1,000 screens in the first year to 235 per 1,000 screens in the second year of screening. Much of this increase was accounted for by dental findings, which rose from 16 per 1,000 screens to 151 per 1,000 screens between the first and second years of screening. This could have been due to a combination of increased experience and skill of the screening team, different treatment staff making the ratings, and the use of data about the screening from the first year to modify

the referral and follow-up procedures. These reasons were also true for the diagnosis and treatment aspects.

A similar increase in the proportion of conditions reaching diagnosis and treatment also occurred between the two years of screening. In the first year, 52% of the conditions referred reached the referral source; while in the second year, this percentage reaching referral source rose to 72%. But again, this increase was principally accounted for by dental problems. Of those conditions referred for diagnosis and treatment, 38% reached the referral source in less than one month and 60% in less than two months.

Conclusions

Program successes in medical screening included:

1. Use of nurse practitioners and paraprofessional teams in the conduct of screening. As with any professional conduct of screening, monitoring of rates of findings and false positives is indicated.
2. Screening in schools (without the use of an extensive child history). The lack of a child history and parent participation is not desirable, but is possible and effective.
3. Reduction of the screening battery by review of findings which led to more vigorous criteria for referral, elimination of routine hematocrits, and elmination of tuberculosis testing.
4. Use of a pedodontist to fill the gap of untreated dental conditions through use of special funds outside of the vendor payment mechanism.
5. On-site treatment by a physician assistant or nurse practitioner for minor acute problems.

6. The use of aides from the ethnic and cultural background of the children in order to facilitate communication throughout the screening and follow-up process with children and parents.
7. Use of on-site treatment alleviated the need for referring many problems.
8. Use of schools resulted in high rates (85-90%) of participation of children in a sparsely populated rural area.

Other lessons or conclusions which may be drawn about medical screening and treatment from this demonstration are:

1. Rural health programs which do not give specific attention to screening and follow-up are inadequate for identifying and treating conditions prevalent in school-age populations.
2. Screening programs should evaluate the usefulness (productivity) of each screening procedure, the periodicity schedule, and should monitor the screening performance of each staff member.
3. Immunizations and systematic records of immunization status requires specific attention. In Cuba, only 33% of the children had immunization records available at the time of the first screen.
4. EPSDT programs should not expect to show immediate gains in health status, as reflected in rates of positive findings on periodic screens. As children increase in age, and, assuming no drastic changes in their life styles, different conditions are likely to occur.
5. Periodic staff training and systematic review of screening procedures are in order for any screening program to maintain quality of screening.

CHAPTER SIX

COSTS

The estimated costs of the child health and developmental program conducted in conjunction with the Checkerboard Area schools are presented in this chapter. Estimated costs, based on the available data, are presented rather than actual expenses, because the primary aim is to provide data that indicate what it would take to replicate a similar program elsewhere. The chapter also discusses the data base for the cost analysis; the methodology of assigning costs to the components of medical and developmental outreach, screening and follow-up case management and treatment; the selection of the appropriate time period of analysis as well as a discussion of the cost effectiveness of the project's approach to child health for school age children.

The Data Base

The two major features of the data base are the number of children served and the expenditures. The number served and conditions found were taken from the HSRI data system forms which were completed by the project for each medical screen and each developmental screen. The costs were developed on the basis of expenditure data on salaries and wages and non-personnel operating expenditures, including equipment, treatment costs, and administrative overhead.

The salaries, wages, fringe benefits, etc., were sent to HSRI by the project as a copy of the pay register maintained and published every two weeks by the Presbyterian Medical Services (PMS) -- the agency responsible for the project under contract to the New Mexico State Department of Health and Social Services. In addition, each staff member kept weekly time sheets in which the number of hours spent in the major project components of medical outreach, screening and follow-up, and developmental outreach, screening and follow-up

were recorded for each day of the week.

The project sent HSRI a copy of each expense voucher of expenditures for supplies and equipment, and PMS periodically sent copies of the accounting balances used for line-item reporting to the Division of Grants Administration of DHEW. One project expenditure was a subcontract to HSRI for data processing and evaluation. However, funds for the evaluation came from multiple sources (including Section 1110 funds granted to HSRI for working with all EPSDT projects). The funding sources for evaluation changed between years. The first year, 1110 funds were granted directly to HSRI. During the succeeding years, the funds were included in the project's 1115 grant. Therefore, rather than include actual evaluation expenses, a cost of $56,000 was assumed to be the minimally appropriate amount (in 1975 dollars) to cover the cost for the data processing and analysis section of the project in order to allow the inclusion of an on-site evaluator and sufficient software for computer-aided analyses described throughout this report. In other programs, some of this evaluation cost would probably be placed under administrative expense.

Equipment costing more than $300 was straight-line depreciated over an appropriate lifetime with no salvage value and charged to the project on the basis of equal increments per budget period. Expenses for equipment costing less than $300 were charged to the month during which they were incurred. There were certain "start-up" costs involved during the first six months of the project which were one-time expenses for acquiring renovated property, making electrical or plumbing connections, training of personnel, as well as personnel time required for planning and preparing the program. The extent and source of funding for such "start-up" expenses would vary from place to place, according to the

existing physical facilities and organizational infrastructure present in the agency conducting the program, so these costs were not considered in this cost analysis. However, the possible need for several thousand dollars "start-up" costs should be recognized and funded by special resource development funds, where necessary.

Special arrangements were made by the project with PMS to cover certain administrative costs (8% of total direct costs) and treatment costs for treatment done by CAHS clinics. Administrative costs (overhead) were included in this analysis because most organizations will need to be reimbursed for them. The arrangements for treatment costs were necessarily unique. The linkage between the project and CAHS made certain service available that would have had to be purchased at higher costs elsewhere had the clinics not been available. On the other hand, the clinic often experienced financial needs and requested, during budget negotiations in preparation for the grant request, that the project include as many treatment dollars as possible. Given a fixed dollar maximum available from the granting agency, fewer funds would have been available for the preventive activities of the project. The clinic, however, argued that if it were to become financially insolvent, the screening program would be of little value. Therefore, an arrangement was negotiated whereby the project paid a minimum sum to the clinic (approximately $40,000) from its budget, regardless of the amount of service rendered, and established a maximum amount to be paid (approximately $75,000), over and beyond which the clinic would continue to provide service. The amount between the maximum and minimum that was actually paid by the project to the clinic was determined by the patient visits actually accomplished. The referral sheet forwarded by the project to the clinic contained a place for entering the

cost of treatment of each child. (The project was billed and then paid the CAHS clinic, unless billings were above the maximum dollar level.) In many instances, the dollar value of the service rendered was below the minimum dollar value; thus, the project paid the clinic more dollars than services received. In the cost analysis, however, the billed amount for actual services was utilized. In the case of the 30 tympanoplasties, the project found other agencies (e.g., Crippled Children's Service and Indian Health Service) which paid these costs, which were not included in the general analysis on the assumption that other screening programs could possibly find such funds also. In the detailed discussion of treatment costs, the surgical costs have been considered and will be described in the discussion.

Cost Allocation Methods

The major activities of the project were outreach, follow-up, screening (medical and developmental), and diagnosis and treatment[1]. The allocation of expenses to each of these activities was first done by computing the percent of the personnel hours of each staff member spent on each particular activity, and then assigning identifiable expenses (from expense vouchers) to each activity. Indirect costs that could not be directly assigned to an activity were added and assigned to each major activity in the same proportion as the percent of total personnel time spent on that activity.

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[1]The costs of outreach are those costs for getting a child to the point of screening. In this project, the costs consist of coordinating with the schools to send letters home with the children, scheduling, and transporting the screening team to schools. The costs of screening involve all the costs of screening the child and conducting associated referrals and paper work. The costs of follow-up (case monitoring) include costs of explaining results to the parents and teachers, determining the extent of treatment received, and assisting the child to get to and through a treatment process.

Time Period of Analysis

The period September, 1975, through May, 1976, was chosen as the appropriate time period for estimating per capita costs. By this time, the project had developed a screening process with a relatively high degree of standardization. Use of this period omits the "start-up" costs and excludes the costs of carrying the staff through the summer, during which time, though working on special treatment and training programs, it was not involved in basic screening activities. Any program working with schools would have a similar problem, but screening could continue by screening pre-school children. Since these start-up and summer costs were left out, the unit costs given below may be understated by as much as 10-15 percent.

Estimation of the Number of Children Served for the "Per Capita" Base

The count of children served for the time period September, 1975, through May, 1976, was based on data available from the HSRI data system. The base for figuring per capita costs for the medical component was different from that of the developmental component, since more children beyond grade three were medically screened than were developmentally screened. Furthermore, some children received original screens as well as periodic screens. To the extent that the original and periodic screen require different resources, a common unit of measure of process output must be developed.

The medical and developmental population base (number screened) will be discussed separately. The base for the medical component is the "medical screen", or a child which received the physical examination plus at least three other screening procedures, e.g., TB test, hematocrit, hearing, vision and dental. During the nine-month time period under discussion, there were 432 initial screens and 508 periodic screens according to this definition.

An original and periodic medical screen were considered to require equal resources, because the periodic screen was given annually to school-age children, and, thus, included the same procedures. Therefore, the base is 940 (508 periodic + 432 original) medical screens.

There were four parts of the developmental screen (intellectual functioning, visual motor perception, emotional adjustment, and English language facility). On the first screen, children received the entire screen, while those receiving a periodic screen were given only that part of the screen on which the child performed poorly on the original screen. Between September, 1975, and May, 1976, a total of 172 children had a periodic screen in only one area; 80 had periodic screens in two areas; 38 had periodic screens in three areas; and 289 children had periodic screens in all four areas. The following procedure was used to reduce these numbers to a single unit of developmental service: a weighting procedure was used wherein each child tested received .2 value units for the time needed to build rapport between the screener and the child and the time needed to prepare a record folder. Such activity was required for each child regardless of the number of areas tested. Each area tested was also given a value of .2 units. A child getting a full screen got .2 points for the preparatory activity and .2 points for each area tested. The following table shows the calculation used to arrive at the number of developmental screening units given between September and May.

Computation of Number of Developmental Screens
That would be Equivalent of Children
Administered all Four Parts of the Screen

Number of areas tested	Number of children tested for a certain number of areas	Full screen equivalents per child*	Total full screen equivalents
1	172	.4	68.8
2	80	.6	48.0
3	38	.8	30.4
4	289	1	289.0
TOTAL	579		436.2

*.2 for each child + .2 for each area tested

Assuming that each child would receive all four components of the developmental screen, the number of children that would have been fully screened for the cost incurred would be best represented by 436, even though 579 children were actually given one or more portions of the developmental screen during the time period of analysis.

The Fully Allocated Costs--Total and Per Capita

The fully allocated costs of the medical component of the project during the nine-month period, including outreach, screening, treatment and follow-up, were $93,936. Using the 940 children that were screened, this amounts to $99.93 per capita, which includes the full costs of outreach, follow-up, screening, diagnosis, and treatment. The cost allocation scheme described earlier allows further division of $99.93 per capita costs as follows: $3.69 for outreach; $48.81 for follow-up; $15.64 for screening; and $31.79 for treatment.

TABLE 6.1

Estimated Costs* for 940 Medical Screens
and 436 Complete Developmental Screens (1975 Dollars)
Conducted in the Schools and Assuming a 70% Rate of Treatment
for Those Conditions Referred

	Medical and Dental Component		Developmental Component	
Project Activity	Total Costs	Per Capita (Total Cost ÷ 940)	Total Costs	Per Capita
Administrative and Operational				
Outreach	$3,470	$3.69	$4,299	$9.86
Follow-up Case Monitoring	$45,881	$48.81	$22,817	$52.33
Total Administrative	$49,351	$52.50	$27,116	$62.19
Programmatic Expenses				
Screening	$14,700	$15.64	$6,807	$15.61
Diagnosis and Treatment	$29,885	$31.79	$21,680	$49.72
Total Medical Screening and Treatment	$44,585	$47.43	$28,487	$65.34
Total Estimated Costs	$93,936	$99.93**	$55,603	$127.53

*Applies only to the Cuba Checkerboard area and the Cuba Checkerboard Area Health System situation. Other environments with other operating volumes and other organizational relationships may have different costs.

**Additional children could be outreached, screened, followed up, and treated for approximately $45 per child.

As with most service programs, the cost of serving an additional child beyond the number actually served (marginal cost) would not be as high as the $99.93 per capita. As developed later in the chapter, the cost of serving an additional 100 children (incremental cost) would probably be closer to $40-$50 per child. However, at the volume of children available to the project and the staff available under the grant, average costs (total costs ÷ number served) or per capita costs (rather than marginal or incremental costs) best represent the costs useful for gross planning purposes. The agency to which the project was attached (PMS) could not survive by charging only marginal costs. The need to recover average costs (per capita) in a rural area is distinct from a situation where an existing child health program is already providing screening and treatment and is asked to take on an additional task of screening more children. For such a program the payment of incremental costs would be sufficient to cover the additional costs. However, since very few programs such as this exist, the Medicaid agency should be prepared to reimburse the full per capita costs of programs which attempt to screen more than 10-15% of the eligible population. The economics of preventive care in rural areas is not like that of urban areas where existing medical care providers are asked to serve additional clients. Thus, Table 6.1 presents the per capita or average costs rather than marginal or incremental costs.

The purpose of categorizing the program activities under programmatic and administrative headings is to illustrate that funding for case finding and case management is different from the routine vendor payment mechanism typical of the Medicaid payment process, in that Medicaid must not only pay for that service which patients generally seek on their own, but also must pay for educating and assisting the patient to utilize the service. In the program described in this report, the price of assisting and getting patients into the medical care system was more costly than the actual provision of the medical service.

If the outreach and follow-up are considered as administrative expenses and the actual screening and treatment are considered as programmatic expenses, the administrative costs are $52.50 per capita and the programmatic costs are $47.50 per capita. The programmatic costs are considered separately because under the current Medicaid program these costs are typically paid to vendors under a fee for service mechanism; whereas the administrative costs are covered under a service contract or as part of the staffing of departments of public welfare. These are shown in Table 6.1.

Also shown in Table 6.1 are the developmental screening costs. The total costs allocated to the developmental component were $55,603 for the nine-month period. If the 436 fully equivalent screens are used as the population base, the percentage cost is $127.53. A population base of 579 different children given one or more tests would make the per capita figure $96 for the nine-month period. Since the 436 fully equivalent screens represents a comprehensive work-up on each child, the $127.53 figure was used in Table 6.1. As in the medical screen, this per capita figure can be subdivided over the major activities as follows: $9.86 for outreach; $52.33 for follow-up; $15.61 for screening; and $49.72 for diagnosis and treatment. This gives an administrative cost of $62.19 versus a programmatic cost of $65.34.

The full costs of treatment are not included in the $99.93 per capita figure for the medical (including outreach, screening, follow-up and treatment), because the project was able to get other agencies to provide some of the more specialized treatment. For example, if the 30 tympanoplasties (@ $1,000 each) were included as treatment costs, the per capita figure for the medical screening would be $132 rather than $100.

Estimated Line Item Budget

Some health planners relate to line item budgets more readily than to gross per capita figures; therefore, a line item budget is presented in Table 6.2. This budget projection (in 1975 dollars) was based upon the staffing experience of the project and the assumption that 1,400 annual medical screens and 1,000 developmental screens would be given to school-age children. The budget includes funding for both the medical and developmental outreach, screening, follow-up and treatment. The aides assisted in both medical and developmental outreach, screening, and follow-up and are shown separately. The relatively high transportation expense is due to the need for several reliable vehicles (which, due to rough roads, wear out after three years) in the remote areas of transporting the screening team and the children to clinical facilities. The data processing and evaluation expenses are necessary if analysis of the cost effectiveness of the operation is to be made by management.

Perhaps an agency contemplating such a project could cover the expenses of one-half of the project director, three-fourths of the evaluation, and one-half of the administration costs through existing local or state funds. In that case, the total budget would be $206,718 for both the medical and developmental screening for a population of 1,400 children, given a cost of $148 per child to cover screening, diagnosis, and treatment for all conditions except those requiring major surgery, but this does not include acute care needs occurring between screens.

Treatment Costs

Based upon the clinic billings, the cost of treating each type of condition was computed for the school year 1975-76, as shown in Table 6.3. The average cost per problem treated was $38.95 (S.E. = 1.94), with dental, vision, and

TABLE 6.2

Estimated Line Item Budget to Operate an EPSDT Program Similar to CUBA EPSDT for Medical and Developmental Screening Volume/Amount for one year (1975 Dollars in the Cuba area) Serving 1400 children

Personnel:		Total Annual Costs
	Classification	
FTE		
1.0	Project Director	$ 17,000
1.0	Secretary	6,500
1.0	Data Technician	6,000
Both Medical and Developmental		
3.0	Community Aides	15,000
1.0	Janitor & Maintenance Personnel	7,000
Medical Only		
1.0	R.N.	9,000
1.0	L.V.N.	7,000
1.0	Audiometric Technician	6,500
.25	Part-time P.N.P.	4,000
Developmental Only		
1.5	Remediation Specialists	13,500
	Personnel Costs	$ 91,500
	Fringe Benefits (@ 15%)	13,725
Total Personnel Costs		$105,225
Non-personnel:		
	Transportation expense (2 vans plus gasoline) annualized amount	$ 14,400
	Out of state travel	2,000
	Supplies - consumable	4,000
	Utilities	1,000
	Evaluation and Data Processing	56,000
	Consultation	5,000
	Building Rental	3,000
	Training and Education	1,000
	Equipment depreciation:	
	Medical	1,000
	Developmental	600
	Treatment Fund:	
	Medical and Dental	42,000
	Developmental	10,000
	Office Equipment and Maintenance	1,200
	Telephone	2,400
Total Non-personnel Costs		$142,600
Administration Costs @ 8% of total direct cost of $247,825 (personnel, legal, accounting, audit)		$ 20,866
TOTAL ANNUAL BUDGET		$267,651*

*Compares to ($100 per medical dollars x 1,400 children screened) + ($127 per computed costs per capita for developmental x 1,000 children screened) = $268.00.

Table 6.3

Mean Treatment Costs and Standard Errors of the Mean
By Problem Category and Total
Second Screening Year

Problem Category	Number of Cases with Cost data	Mean Dollar Cost	Standard Error of the Mean
Infective	4	$10.90	1.15
Vision	81	31.36	0.77
Eye Disease	13	15.09	1.98
Hearing	41	8.80	0.30
Heart	116	20.74	1.17
Caries, other dental	153	68.70	3.55
False Positive	46	16.53	.97
Total (including false positives)	479	$36.70	1.77
Total (excluding false positives)	433	38.95	1.94

Table 6.4

Average Treatment Cost by Seriousness and Condition Treated
(standard errors in parentheses)

Problem type	Seriousness					
	Mild		Moderate		Severe	
	No. Cases	$ Per Case	No. Cases	$ Per Case	No. Cases	$ Per Case
Dental caries	28	$27 (6)	32	$57 (7)	77	$96 (6)
Heart	84	$16 (2)	8	$26 (5)	3	$60 (37)
Vision	5	$29 (3)	50	$31 (1)	4	$36 (.5)
Hearing	18	$9 (.5)	12	$25* (4)	8	$1000* ($100)

*Estimated from interview with the ENT specialist at the CAHS

heart problems having the highest cost per problem treated at the clinic. An additional $1,000 was spent by other agencies for each of 30 tympanoplasties, which raised the average cost per problem treated to $101.22. It was possible to look at costs by seriousness ratings for dental, heart, and vision problems. These results are shown in Table 6.4. The cost of treatment of vision problems showed no association with their seriousness rating; however, the cost of treatment of dental, heart, and hearing problems was related to their seriousness. Hearing problems rated severe were estimated to cost 125 times more than mild problems; severe caries estimated 3.6 times more costly than mild caries; and severe heart problems were estimated to be five times more costly than mild ones.

Utilizing the distribution of problem diagnoses shown in Chapter 5, the cost of treatment of these conditions would have been reduced by at least $17,718[2] if earlier and effective intervention and treatment had been obtained for only one-third of the moderate to severe cases of dental, heart, and hearing problems. The savings would have been enough to cover 6% of the costs of the entire medical program and nearly one-half of the screening costs. Both diagnosis and follow-up costs could be reduced if false positives were reduced. Referring to Table 6.3, it can be seen that each diagnosed false positive resulted in a cost of $16.50 for diagnosis alone. In addition, the fully allocated direct and indirect <u>average follow-up cost</u> was [($48.81[3] x 940) - 641 diagnosed] $71.58[4] per condition reaching diagnosis, or $54 per

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[2][84 severe dental x ($ 96 - $27 difference between mild and severe] + [88 moderate dental ($57 - $27)] + [30 ear problems x ($1000 - $100)] = $35,436, if all could have been avoidable.

[3]The $48.81 was obtained from Table 6.1.

[4][71.58 x .6 direct x .5 of time required for a true problem] = $21.50

condition referred. Since direct costs were approximately 60% of the total costs, and assuming that a false positive required half the follow-up effort of a true problem, then a minimum estimate of the follow-up cost eliminated for each false positive would be $21.50. This, added to the $16.50 for diagnosis, gives $38.00 per false positive. Therefore, efforts to reduce the rate of false positives in any program are much in order. The reduction of false positives requires analysis of findings, training of staff, specification of referral criteria, and close medical supervision of screening procedures and, therefore, will involve an investment of funds which must be balanced against this cost of false positives. The point of this section is that such expenditure has a high probability of payoff.

Cost Reductions if Selected Procedures are Eliminated

An important use of the evaluation involved consideration of which screening procedures to retain. As will be discussed in the chapter on Priorities for Screening, this was accomplished by reviewing the yield of findings of each procedure in comparison to the cost of that procedure. This section addresses the costs that would be reduced if any single screening procedure is eliminated. In multiphasic screening, there are considerable costs (at least 40% of total) which occur regardless of the number of screening procedures performed, since the screening team must make arrangements with the schools, be transported to the schools, and open records on and establish rapport with each child. The costs that could be eliminated through dropping a screening procedure would include the costs of supplies; personnel and equipment for screening purposes; follow-up costs for referrals generated by the procedure, including false positives; and diagnosis treatment costs resulting from problems referred as a result of the screening procedure. Each of these aspects will be discussed.

Screening Costs of Selected Screening Procedures

The staff was asked to estimate from their experience the time required, the minimum skill level of personnel, and the equipment and supplies for each screen. The equipment was depreciated over ten years on the assumption that 1,400 screens could be accomplished with the equipment per year. Appendix F contains the estimation assumptions item by item. The results are summarized in Table 6.5 by screening procedure. The most expensive screening activities include hearing testing, maintaining records, and the physical exam, at $2.74, $2.23, and $1.57, respectively, per child screened. The total costs from this estimation came to $9.74, which may be considered the screening cost of one additional or one less screen at a volume of 1,400 screens. This is the equivalent of the economic concept of marginal costs (cost of one more unit of output). It is less than the average cost of $15, shown in Table 6.1, because the $9.74 does not include the fully allocated costs of management staff, evaluation, and a minimum level of support staff necessary to conduct even a few hundred screens.

Follow-up and Treatment Costs of Selected Screening Procedures

The treatment costs resulting from a selected screening procedure were computed by multiplying the treatment costs per condition, as presented in Tables 6.3 and 6.4, by the expected number of conditions in 1,400 screens, which were based on the rates of referrals reaching diagnosis shown in Chapter 5, Table 5.6.

The treatment cost for each procedure, when divided by 1,400 screens, is shown in column 4 of Table 6.6. The total treatment cost per child screened was computed on the assumption that 70% of the problems referred would reach treatment and that there would be 1,400 screens. With 1,400 cases, the per capita treatment cost would be $16.23. The direct follow-up costs were computed to be

Table 6.5

Direct Screening Costs Per Child for Each Screening Procedure
(1975 Dollars)

	Costs per child screened			
	Personnel*	Equipment	Supplies	Total
Urine	.166	0.00	.254	.42
Tuberculosis	.266	0.00	.102	.33
Hearing	.83	1.91	0.00	2.74
Height and Weight	.111	.007	0.00	.12
Blood Pressure	.151	.018	0.00	.17
Temperature	.075		.08	.16
Immunization Records Checked	.527		.02	1.20
Hematocrit	.339	.023	.14	.36
Vision	.277	.021		.44
Physical Exam	1.467	.058	.048	1.57
Records	1.956		.27	2.23
				9.74

*Assumptions: *The personnel costs include cost for office space, fringe benefits, and direct overhead as follows:
Assumes 1400 screens per year
Space 10 x 10 at .25 x 12 - $300 each;
Personnel costs = salary + ($.13 x salary) for fringes + ($.2 x salary) for other overhead.

$30 per condition referred. As shown earlier in this chapter, the actual follow-up cost was approximately $50 per condition referred; but if it is assumed that only 60% of these costs could be reduced if fewer conditions required follow-up, then reduction of follow-up costs by dropping a screening procedure would be $30 per condition referred ($50 x .6). Applying this figure to the expected number of conditions referred and dividing by 1,400 screens, the follow-up cost per child screened is obtained. These costs are shown in column (5) of Table 6.6. The total of all follow-up costs is $19.92 per child screened; that is, if screening were eliminated for some children, the follow-up costs would be lowered by $19.92 per child not screened. The total costs would be lowered in total (screening, follow-up, and treatment) by $45.87 per child not screened.

If the marginal costs for screening, treatment, and follow-up of conditions found as a result of a specific screening procedure are combined, the marginal cost of each screening procedure can be computed. The results are shown in Table 6.7. The last column of the table reveals that the most expensive procedures (i.e., screening, treatment, and follow-up costs per child for each procedure dropped) were dental (@ 19.79 per child),vision (@ $7.44 per child), medical physical (@ $7.24 per child),and hearing (@ $4.88 per child).

Estimated State Program Costs

On several occasions, a New Mexico EPSDT screening team came to Cuba to screen pre-school and school-age children who were Medicaid eligible. The project had originally agreed to screen the children for the state program, but HEW required eligibles to be screened within 60 days of indication of interest at time of AFDC eligibility determination. Because of this rule, the project's annual schedule of screening was not acceptable and the state screen-

Table 6.6

Computation of Treatment Costs "Per Child Screened" and Follow-up Costs

Problem Category	(1) Expected # of referrals to clinics **	(2) Expected # reaching diagnosis **	(3) Treatment cost per condition ***	(4) Treatment cost per child screened ****	(5) Follow-UP cost per child screened *****
Dental*	450	mild = 77 mod = 78 sev = 78	27 57 96	1.48 3.17 5.34	9.64
Vision and Eye	204	vision= 147 eye = 24	31 15	3.25 .26	0.62
Heart Murmur	106	97	21	1.46	2.27
Hearing & Ear	79	70	9	0.45	1.69
Abnormal Measurements	38	13	15	0.14	0.81
Other	22	20	15	0.21	0.47
Anemia	8	6	10	0.04	0.17
Hematuria	8	8	25	0.14	0.17
Orthopedic	5	5	60	0.21	0.11
Warts	5	5	10	0.04	0.11
Skin	5	5	10	0.04	0.11
Total	930	633		16.23 per child screened at the 71% rate of referrals reaching diagnosis out of 1400 screens and resulting 930 referral.	19.92

*1/3 mild, 1/3 moderate, 1/3 severe

**Based on Table 5.7 in Chapter 5 and data not presented in that table due to small numbers.

***From Tables 6.3 and 6.4

****[Col. (2) x col. (3)] ÷ 1400

*****Col. (5) = [$30 per condition referred x col. (1)] ÷ 1400 screens

Table 6.7

Computation of Total Marginal* Cost for Each Screening Procedure

Procedure	Screening	Treatment	Follow-Up	Total of the The Procedure
Urinalysis	$0.42	$0.14	$0.17	$0.73
T.B. (@ 20% other)	0.33	0.04	0.03	0.40
Hearing	2.74	0.45	1.69	4.88
Height and Weight	0.12	0.14	0.81	1.07
Blood Pressure	0.17	0	0	0.17
Temperature	0.16	-	-	0.16
Immunization Records	1.21	-	-	1.21
Record Keeping	2.23	-	-	2.23
Hematocrit	0.34	0.04	0.17	0.55
Vision	0.44	3.25	3.75	7.44
Physical Exam Medical	1.41	2.17	3.66	7.24
Dental*	0.16	9.99	9.64	19.79
				45.87

*These are not full costs, but costs that would be saved upon deletion of given procedures.

Table 6.8

Estimated State Screening Team Expenses for Screening
Medicaid Children in the Checkerboard Area
For the Screening Component Only

Day 1: (0 children screened)

Staff			
1 Physician's Assistant @	$72*	per day	= $ 72
2 R.N. @	$60	per day	= 120
2 L.P.N. @	$42	per day	= 84
Motel, transportation and Food Costs			= 75
TOTAL			$351

Day 2: (13 children screened)

Staff			
1 Physician's Assistant @	$72	per day	= $ 72**
2 R.N. @	$60	per day	= 120
2 L.P.N. @	$42	per day	= 84
2 Social workers @	$54	per day	= 108
			$384
Hotel, Transportation and Food costs			120
TOTAL			$504
Per child			504/13 = $38.76

Day 3: (26 children screened)

Staff			
Same as Day 2			= $384
plus 2 Social Workers @	$54	per day	= 108
			$492
Transportation, Food, etc.			100
TOTAL			$592
Per child			592/26 = $22.77

Day 4: (32 children screened)

Staff			
Same as Day 2, but no social worker			= $376
Per child			376/32 = $11.75

Day 5: (27 children screened)

Staff			
Same as Day 4			= $376
Per child			376/27 = $13.92

Total expenses for five days	$2199	
Total screened for five days	98	
Screening cost per child screened	$22.44	per child screened in 4 days of screening; 5 days of team presence

*Rates include a comparable "overhead expense" as applied to the project salaries.

**This figure may be too low.

the screening. Letters were sent to the families, but transportation was not generally made available. Screening was conducted over a five-day period with no on-site treatment and no known follow-up other than a letter sent to the parents notifying them of the problem. The personnel came from Santa Fe and worked from 9:30 to 4:30, with one hour for lunch. On one occasion, when no children had appeared by 2:00, the screening team left; and then families appeared at 4:00 with children to be screened, but no one was there to screen them. Although it is realized that there were few Medicaid enrolled children in the area and that a full-time team could not be supported by Medicaid payment funds alone, it is interesting to compare the staffing mix of skill levels between the Cuba and the State EPSDT effort. The cost of one week of such screening is outlined in Table 6.8. The estimated cost of $22.44 is comparable to the marginal screening cost of $9.74 incurred by the project and does not include rental of equipment or supplies expense. The conclusion for the State and project comparison is that staffing for appropriate use of the appropriate skill level in personnel can result in substantial dollar savings to a statewide screening effort. In addition, if the State could link into existing screening programs which offer screening to children at least once per year, without the strict requirements of a 60-day response, cost savings could result.

Conclusions about Costs of the Child Health Demonstration Project in the Cuba Area

The total program costs (including fully allocated costs of administration, evaluation, outreach, screening, treatment and follow-up) of $99.93 per child reflect the commitment of society's resources which is necessary to conduct a program which finds and treats the types of medical and dental conditions

described in Chapter 5. If some of the program management costs, evaluation, and administrative overhead are cut to the bare bone, the cost would be closer to $60-$65 per child in target population per year. More than half of this cost goes toward getting the child to the screening team (or vice-versa) and for follow-up to ensure treatment. The cost of serving an additional child (assuming 1,400 per year) was computed at $45. This serves as an estimate of the funding necessary for an existing agency to agree to expand their child health effort, if basic services are currently provided at a reasonable volume. It was also shown in Chapter 5 that substantial dollar savings can result from eliminating false positives by strict referral criteria and use of para-professional staff with sufficient training to conduct some of the screening steps and outreach.

The developmental component, when conducted in the schools as a separate activity from medical screening, required an average of $127 per child screened, which included all costs of outreach, screening, follow-up and remediation. Again, however, if the project management, evaluation, and administrative overhead were cut to bare bones, developmental could probably be accomplished for less than $100 per child, and could be further reduced if children were not screened with all tests each year. If only 70% of the children required the complete developmental screen, the total cost of medical and developmental activity would approximate $270,000 for a population of 1,400 school-age children.

The costs of replicating such a program as done by this demonstration would depend greatly on the existing organizational structure and kind of screening activity already present in the community; but if the program starts from almost no program for children, a $270,000 annual budget should be adequate for a good program serving 1,400 school-age children, with a marginal cost of $45

per child added for the medical program. The marginal cost for each child added to the developmental component was not computed, but would probably approximate an additional $45 per child.[4]

[4]Since the costs were very similar to the medical component.

CHAPTER SEVEN

DETERMINING PRIORITIES FOR MEDICAL SCREENING

At the end of the third year of demonstration funding, the project was faced with a drastic cutback in funds for medical screening.[1] As a result of this reduction of funds, a hard look was taken at staffing patterns, screening methods, etc., for possibilities for economizing. Certain decisions were made on the basis of existing data, and a new program (described in Chapter 4) was developed. Further analysis of the data has resulted in other possibilities for prioritizing which children to screen, and by what procedures. The chapter is presented as an illustration of how such priorities could be set in a specific community with a given staff. While the process could be useful in other areas of the country in child health program management, the specific recommendations for the Checkerboard area are not particularly suggestions for the entire nation. In this chapter, the priority decisions that were made, as well as those that possibly would have been made in light of a more detailed analysis, are listed. The basis for such decision-making will be presented, utilizing the data available from the other chapters of this report. The decisions made in order to reduce the cost were:

1. Eliminate tuberculin and hematocrit testing from the screen.
2. Refine on-site treatment or referral criteria for the urinalysis, cardiac auscultation, and trachoma check.
3. Reduce the staff to the lowest possible skill level needed to perform each screening task--thereby using the PNP only as needed for screening,

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[1]The Health for Underserved Rural Areas (HURA) grant to CAHS allowed only $25 per child for medical screening, including outreach and follow-up case management. Treatment dollars were available, however, as part of the total health care program.

the R.N. for administration and follow-up, and a paraprofessional audiometric technician and a data clerk.

4. Eliminate computer data processing, external evaluation, computerized review of outcomes of referrals, and health status ratings. (This will be discussed further in the Appendix, which pertains to the record system). A manual data collection system now simplifies further analysis of screening findings for local use.
5. Put dental screening and treatment under separate funding.

Additional analysis led to other feasible changes which were not made. These included:

1. Placing first priority on "high risk" schools (those located in Torreon, Nageezi, Lybrook, Brethren Navajo Mission, Ojo Encino, and Lindrith--which made up 26% of the children screened in the course of the project).
2. Screening children primarily of the ages 6, 7, 10, and 12 (children of these ages accounted for 43% of those actually screened in school year 1974-75).

The basic criteria for selecting screening procedures was to retain those procedures providing the greatest number of new and moderate to severe conditions treated per dollar spent. Table 7.1 brings together the information on the number of such conditions found in school year 1975-76. The table assumes that 1,000 children are screened. The physical examination is, for purposes of this table, partitioned into four compartments--heart, orthopedic, other medical, and dental. The partitioning of the associated costs were derived by the formulas shown at the bottom of Table 7.1. The procedures with the lowest cost per moderate to severe condition diagnosed (see Column 3 of Table 7.1) were, in order: dental, vision, orthopedic, urinalysis, hearing, heart, and other medical physical. Procedures for which no new and moderate

TABLE 7.1

Total Screening, Follow-up and Treatment
Cost per Moderate to Severe Condition Diagnosed
Assuming 1,000 Children Screened (1975-76)

Procedure	(1) Number of Moderate to Severe Conditions (not prev. under care)	(2) Total Screening, Treatment and Follow-up For Each Procedure	Cost per Condition Col. (1) ÷ Col. (2)
Hematocrit	0	550	0
Urinalysis	2	730	$365
T.B. Test	0	400	0
Height & Weight	0	1,070	0
Hearing	13	4,880	$375
Vision	54	7,440	$138
Physical Examination			
Heart	10	3,900*	$390
Orthopedic	1	350**	$350
Other parts of physical	4	2,990	$748
Dental	157	19,790	$126

*Heart costs = Treatment + Follow-up + Screening $= \left[\frac{(\$20 \text{ per prob.} \times 75)}{1{,}000 \text{ Screens}} + (\$76 \times 2.20) + (.2 \times \text{Screen})\right] = \$3.90$

**Orthopedic costs = Treatment + Follow-up + Screening $= \left[\$10 \times \frac{4 \text{ problems}}{1{,}000 \text{ Screens}} + (\$.11) + (.2 \times \text{Screen})\right] = \$.35$

to severe conditions were diagnosed included: hematocrit, tuberculin test, and height and weight measurements. Because of this low yield, the procedures of hematocrit and tuberculin screening were dropped and height and weight measurements fell into question. Other considerations surrounding decisions to retain or drop screening procedures will be discussed below.

Dental: Dental screening, an important component of child screening, has first priority in terms of the low cost per new and moderate to severe condition diagnosed. Difficulties with dental manpower and the logistics of dental treatment, however, require special efforts, as discussed in Chapters 4 and 5. More research is needed to find better ways of combining medical and dental screening and treatment in a cost-effective fashion. EPSDT dental screening in the Checkerboard Area Health System is now integrated into dental treatment. The Indian Health Service and other funding sources are now covering dental screening.

Vision: Children referred were those who tested 20/40 in one eye or at least one line difference (20/20 vs 20/30) between the eyes with glasses on if needed and available. The number of children diagnosed as having moderate to severe and correctable vision problems made the decision to continue vision screening straightforward.

Orthopedic: The orthopedic screen was included as part of the general physical examination performed by the PNP. All referrals made were for two conditions: suspect rotational problems of the lower extremities (toeing in, toeing out) and abnormal curvatures of the spine. It was thought at the end of the program that the true prevalence of orthopedic abnormalities was probably higher and that the small number of positives may have been due to lack of standardization of the screen and the failure to undress children in the first year of the project. A standardized orthopedic screen (as described

by Hensinger[2], et. al.) performed by the CAHS registered nurse was used in school year 1976-77 with a higher percentage of referrals. Interestingly, there were conflicting diagnostic impressions on referrals of children with orthopedic and cardiac problems in 1976-77. Experience of the CAHS with the lack of diagnostic standardization will hopefully lead to refinement of the diagnostic referral process. Nevertheless, sufficient problems were found and corrected to justify retention of orthopedic screening.

Urinalysis: The criteria for referral was 1+ or greater protein or any sugar, acetone, or blood. The few problems that were found were considered severe enough to warrant retaining urinalysis testing. Additional steps were taken to eliminate false positive referrals (see Chapter 4).

Hearing: Of the 123 children with ear problems referred, 39 were in need of unilateral or bilateral tympanoplasties. Of these, 20 received the necessary surgery in March, 1976, and 10 subsequently. Three did not have surgery because of parental refusal, and the remainder are being followed until surgery can be obtained. The successful correction of a large number of hearing problems resulted in retention of audiometric screening with the impedance bridge.

Heart: Of 146 cardiac murmurs referred, most were diagnosed as innocent. However, 20 were diagnosed indeterminate and 11 as pathologic. A survey by the CAHS medical director of referral reports showed that approximately 20 children had possible or proven pathologic murmurs. Several of these children now receive prophylactic treatment and one has received heart surgery. On a periodic screen, it was discovered that one of these children had discontinued prophylactic medication. This illustrates the importance of follow-up to

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[2]Hensinger, Robert N., et al, "Orthopedic Screening of School Age Children", Orthopedic Review, Vol. IV, No. 1, January 1975.

insure treatment compliance. On the basis of this experience, cardiac murmur screening was continued, with the design of more specific criteria for referral.

Other Physical: The cost per moderate to severe condition for the "other" physical examination findings was fairly high and some may argue that the examination should be limited to a standardized orthopedic, cardiac, and dental screen which could be done much more quickly than a thorough review. However, the complete unclothed physical examination detected enough minor problems requiring on-site treatment (ENT problems, in particular) that it was still considered valuable. It is also a good opportunity for individualized health education. With eye examinations, all children suspected of having follicles of the tarsal plate, a characteristic finding in trachoma, were referred. However, 50% of the children referred were subsequently diagnosed "negative". It was, therefore, decided to retain the trachoma check but to provide specialized training in the recognition of follicles of the tarsal plate for the screeners. Criteria for referral are now more specific -- three or more follicles of the central tarsal plate.

Hematocrit: The rate of referral was low and all but one of the cases were borderline. The criteria for referral was 35% or less, and 50% or more. The possible reasons for the low prevalence are: (1) most school-age Navajo children in the Checkerboard Area have a diet high in mutton; (2) school lunch programs provide adequate nutrients to prevent iron deficiency anemia; and (3) the water in the area is high in iron content. Since the test was traumatic and all but one of the few referrals were borderline, the procedure was dropped in the new Checkerboard school screening program.

Tuberculosis: Of ten children who were tuberculin positive (5 mm or greater induration 48-72 hours after application of PPD by the Mantoux method), three were subsequently identified as previously known reactors and were not referred. Of the seven referred, four were already being followed in Checkerboard clinics. Therefore, only three or 0.18% of the total number screened were new. In view of the low yield and the concurrence of the New Mexico State Health Agency, school tuberculin screening was discontinued. It may be noted that the Checkerboard Area Health System has an excellent TB control program which reaches almost all contacts of new adult cases through the clinics.

Height and Weight: Approximately 14% of the children screened were below the third percentile on the Boston Anthropometric Charts for height, and 10% were below the third percentile in weight. It was interesting that there was less difference among the three Checkerboard ethnic groups than between all Checkerboard children and those in the Boston group. It is difficult at this time to draw conclusions, but it is felt that many hereditary and environmental factors may be responsible.

Periodicity: Chapter 5 contains a discussion of the periodic screening results. Because the rate of new findings is comparable to that found on original screens, it does not appear wise to reduce the periodicity until more data are available for third and fourth periodic screens.

Prioritization by Schools: A comparison of the number of positive findings per child (positives - number screened) for each school is shown in Table 7.2. Slightly different priorities are indicated when dental findings are excluded from the number of positives. It appears that the schools of Torreon, Nageezi,

TABLE 7.2

Possible Priorities of Schools for Screening

Priority on Total Positive Findings Per Child	
School	Positives ÷ # Screened
Torreon	1.060
Nageezi	.968
Gallina	.907
Brethren Navajo Mission	.899
Lybrook	.877
Ojo Encino	.786
Chaco Canyon	.786
Lindrith	.655
Largo	.631
Cuba	.515
Dzilth	.504
Coyote	.444
Immaculate Conception	.424
Carson	.500
Brethren-in-Christ	.410
Berean	.340
Canones	.300

Priority on Total Positive Findings Per Child	
School	Positives ÷ # Screened
Lybrook	.608
Torreon	.553
Nageezi	.501
Brethren Navajo Mission	.447
Lindrith	.379
Largo	.369
Dzilth	.351
Gallina	.382
Ojo Encino	.327
Berean	.324
Chaco Canyon	.320
Below .3	
Cuba	
Brethren-in-Christ	
Canones	
Carson	
Coyote	
Immaculate Conception	

Lybrook, Brethren Navajo Mission, Ojo Encino, and Lindrith should get priority effort for screening and follow-up in subsequent years.

Age Priorities: The pediatric nurse practitioner who performed most of the physical examinations was asked to make a subjective healthiness rating on each child in light of the screening findings. On a scale from one (life-threatening condition) to nine (picture of health), she was asked to assess the current level of healthiness of the child and then to estimate what the health would be after the receipt of treatment within six months. The average potential increase (six month estimated rating minus current rating) was .89 units of healthiness (number rated = 1,465; standard deviation = 1.22) with a standard error of .032 units. Children were grouped by age and ethnicity, and the average potential health increases were computed. Age/ethnic groupings having more than 20 children rated during the school year 1974-75 and showing a potential increase of more than one unit included the six and seven year old children of all ethnicities, and the Navajos over age eight. Although the CAHS did not choose to prioritize in this way, it would be possible for a screening program to conduct one or two years of medical screening, diagnosis and treatment for the entire population; then, for future years of screening, to prioritize the children to be screened first according to age grouping to maximize the potential health increase per dollar spent.

Conclusions

Examples based on the Checkerboard data were presented, showing alternate ways to prioritize the screening effort under a constraint of limited funding after the initial round (perhaps two years) of screening an entire school-age population. Each locality will have different frequencies of findings in the

initial years of screening, but the same prioritization models[3] could be used where limited resources are available. In this example, it was shown how the CAHS will attempt to increase health gains per dollar spent by eliminating the tuberculin and hematocrit testing from screening and refining the referral criteria for the urinalysis and the cardiac, orthopedic, and trachoma examinations. In addition further increases might be realized in the future by:

1. Placing first priority on schools located in Torreon, Nageezi, Lybrook, Brethren Navajo Mission, Ojo Encino, and Lindrith (these schools would include 26% of the screens).
2. Screening all children aged six and seven, as well as Navajo children over eight (would have been 44% of those actually screened in 1974-75).

If some combination of these were used, approximately 500 children would be screened each year on a budget of $47,500 for outreach, medical screening treatment and follow-up, instead of the $93,555 estimated cost spent if a full program were offered throughout the CAHS.

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[3]Methods utilized for prioritization included (a) cost per new and moderate to severe conditions, and (b) number of positive findings per child screened, or (c) potential increase in healthiness rating.

CHAPTER EIGHT

SUMMARY AND RECOMMENDATIONS

This chapter provides a brief summary of the accomplishments of the Checkerboard EPSDT demonstration project and outlines a series of recommendations for EPSDT and other child health programs based on the experience and lessons learned in the conduct of the project. Some of the recommendations apply specifically to screening in schools and in rural areas, while others are more general and apply to state and federal programs.

Summary of Accomplishments

General Objectives

The general goal of the Checkerboard demonstration by the second year of operation was to develop and implement a model program for the delivery of medical and developmental screening diagnosis and treatment of children in a rural area with the intent that the model could be replicated in whole or in part in other rural areas. The evidence presented in the preceding chapters indicate the extent to which this goal was attained. Although, as yet, no attempt has been made to replicate the program in other areas, its success is evident in two concrete ways. First, there is now in place in the Checkerboard Area a new school health/screening program operated as a joint venture between the schools of the area and the CAHS. The second fact is that much of what was learned in this demonstration is being incorporated into a new statewide school health program in New Mexico.

The project, though focusing primarily on the screening of children in kindergarten through grade three, clearly demonstrated by a high participation rate the value of school screening in sparsely populated areas. There is every reason to assume that the level of participation would have remained high, had

the screening been extended to all grades. It has to be recognized, however, that school screening has a major shortcoming--very young children not in preschool programs are not served. These children can best be served by community clinics with an EPSDT component, as was tested in other demonstration projects.

As for several other objectives enumerated in Chapter One, the project designed and operated a model screening program; it recruited, trained, and effectively employed indigenous workers as paraprofessionals on the screening teams; it developed and utilized referral and other services for diagnosis and treatment and for training its personnel; it provided health education resources for the schools, parents, and children; and developed a computerized data system useful for management and evaluation.

Since the area was so isolated (average of 40 miles to get to most of the schools out of Cuba area) and the dirt roads were so rough and, at times, impassable, radio equipped vans (with perpetual maintenance) became essential to the success of the program.

Screening Objectives

Medical Screening: In carrying out its objective of conducting medical screening, diagnosis and treatment, the project's accomplishments under difficult and complex sociocultural and environmental conditions were numerous; 1,661 children in 16 different schools received 2,201 original and periodic medical screens. There were 1,898 medical and dental positive findings (an average of 1.14 per child). Of this number, 42% were referred to school nurses for care or were treated on-site. The majority of the problems referred were chronic. A total of 725 referred problems had the outcome known by the end of the data collection period and, of these, 38% reached treatment in less than one month, and 60% reached treatment in less than two months. During the last year of the project,

over 80% of the referred problems were known to have been treated due to special emphasis on follow-up and through spreading the screening throughout the entire school year rather than trying to do it all at once at the beginning of the year. A three-week cycle was found to be helpful--developmental screen, medical screen, and follow-up plus feedback to the teachers. Perhaps the most dramatic outcome of the medical screening was the tympanoplasties indicated for children identified by screening as having a hearing problem. By the close of the project, 30 of these had been performed successfully. With the exception of two children whose parents refused surgery, the rest needed to wait (for medical reasons) until a later date before surgery could be performed.

The suggested staff for conducting medical screening included a registered nurse, a licensed practical nurse, a part-time pediatric nurse practitioner, an audiometric technician, two aides, and a data technician. Equipment found to be useful in reducing, but not eliminating, false positives and false negatives included the acoustic impedance bridge for hearing testing (along with a 25-decibel tone) and a lighted E Chart for vision. Disposable thermometers saved time. The hematocrit was performed by taking the centrifuge into each school.

Annual screening was found to be useful in detecting high rates of new and serious problems, although only two years of periodic screening meant that the results of periodic screening beyond two years is not yet known in the Cuba area.

Developmental Screening: Developmental screens were given to 1,156 children and some of this number received a periodic screen, increasing the total to 1,890 screens. Some 230 children received extensive psychoeducational diagnostic evaluations and over 75 children took part in special developmental enrichment or therapeutic programs designed and implemented by the project. Since few

Navajo children have preschool experience with English, it is not surprising that they did poorly on English usage. However, on the Wechsler Block Design subtest, Navajos performed as well as the Spanish and Anglo children. This test, which assesses intellectual capacity, is likely the most nearly "culture free" of the tests used.

The value in the use of such a test in screening is that teachers will be more likely to distinguish the children who have English language problems from those who may be lacking in the ability to abstract, conceptualize and learn quickly if spoken to in an appropriate language. The Bender was useful in testing for visual-motor perception problems. Screening results, when presented to a receptive teacher with some suggested remedial and enrichment tasks, offer an exciting potential of developmental screening. The emotional adjustment, measured with the Human Figure Drawing and the Bender resulted in an excessively large number of children being scored low on emotional adjustment (for reasons that have not yet been determined). The data upon which these emotional indicators were originally developed for children are, at best, statistically weak.

It was found that by careful preparation of indigeneous testers, parts of certain existing psychological instruments can be administered within a reasonable time (30 minutes of less). Developmental screening was found to be useful to teachers and project staff. It should be pointed out that as soon as a developmental staff with a diagnostic capability became available to the community, the staff was deluged with requests from parents and schools for diagnostic help for children already identified as having problems.

On the one hand, screening should not be started until the known unmet need is fulfilled but, on the other hand, the diagnostic workups require 14 hours and,

in this case, a prioritizing mechanism is needed for children needing help. Perhaps with teachers and parents given feedback from the screening, the need for diagnostics could be reduced in a preventive way. The problem of Navajo children being taught in English when 80% understand little English created problems for children in school. This problem needs to be handled on a massive scale through innovative educational programs.

More research is needed before the emotional problems can be adequately assessed. However, in the areas of intellectual functioning and visual motor perception, 5 - 10% of the target population in kindergarten through grade three had problems that needed expert attention. The language testing is important to point out, in comparison to the results of intellectual screening, why the child is not learning.

Screening Costs

Medical: The medical screening, diagnosis and treatment was carried out at a cost of $47.73 per child screened. With additional part-time staff, the screening output could have been increased approximately one-third for a marginal cost of $7.75 per child. Since the screening was conducted in schools, the cost of outreach was low--$3.00 per child--which compared very favorably to the costs of $10 - $35 in other projects utilizing community clinics. However, the cost of follow-up was estimated to be $45,881 for the representative nine-month period between September 1975 and May 1976. This meant that if the total cost of outreach and follow-up case monitoring were compared to the total cost of screening, diagnosis and treatment, the outreach and case monitoring costs would exceed the medical costs in this project. The extent to which this holds true for other organizations would depend upon the level of participation desired and the availability of existing staff.

Developmental: The cost for the developmental screen was $15.61 per child screened for the testing alone. With the addition of the costs of follow-up and feedback to teachers and parents (which, on the medical screening, are included as activities separate from feedback), this cost rose to $49.73 per capita.

Discussions and Recommendations

A project of this magnitude, conducted under the physical and sociocultural conditions of the Checkerboard, entails many factors not encountered in most EPSDT programs. This should be kept in mind in what follows. It should also be recalled that the project was not designed to demonstrate the cost-benefits of such programs, but was to explore ways and means of effective provision of EPSDT screens to school children under the conditions prevailing in rural areas. The discussions and recommendations given below are listed randomly and the order does not imply relative importance or priority.

School Cooperation: Screening in schools obviously requires cooperation on the part of schools and a great deal of coordination on the part of EPSDT staff members. This involves both administrative agreement and support for the screening which must be obtained before a program can be developed. Assuming such support, several other factors must be dealt with:

Medicaid/non-Medicaid Eligibles: If screening is limited to Medicaid eligible children only, there must be a sufficient number of eligibles in a school system to justify a program. Moreover, and of critical importance, how can such a program be conducted without calling undesirable attention to the eligible children? This project obtained a waiver which allowed all children to be screened regardless of Medicaid eligibility. However, without grant funds and

such a waiver, what can a Medicaid agency do? An informal survey of parents in the community indicated that most would be willing to pay at least $5 to $10 per child. This would mean that a sliding scale is possible if the Medicaid agency could agree to pay for the Medicaid children and part of the costs of the non-Medicaid children. Although the non-Medicaid children are not eligible, it may be cheaper to screen all children in the school than to outreach and screen only Medicaid eligibles. The only major difficulty would be gaining the cooperation of the local health providers.

Recommendation: Conduct a demonstration of school screening in some locality having a large number of Medicaid eligibles where a sliding fee scale is used for non-eligible children, and the sliding scale fee is sufficient to cover the marginal cost of screening the non-Medicaid eligible children, or contract with school nurse practitioners, when available, to conduct the screening of the Medicaid children.

Coordination with School Schedule: Cooperation of teachers and lower level school administrators cannot be taken for granted, even though top administrative approval is given. Disruption of school and class routines and additional work for teachers will be resisted unless the program is carefully and accurately explained, including its possible benefits to teachers, administrators, and school health personnel. Ideally, teachers would be informed of screening results, particularly those most likely to have obvious implications for the health, behavior and performance of their students. This requires project staff and teacher time and must be carefully programmed.

Recommendation: When funding school-centered screening, allocate sufficient funding and time for extensive coordination and planning with the schools.

Outreach

School Centered Screening: The advantage of school screening, particularly in isolated rural areas with poor transportation and communication, is that children are concentrated on a scheduled basis at one or more locations. This, as in the case of the Checkerboard project, increases the participation rate and reduces the outreach costs. Since most of the outreach costs of the demonstration were expended for work with the schools, it is not likely that costs will be appreciably reduced in areas with better transportation and communication.

If child histories are deemed necessary and parents are not expected to be present at the screening, then a procedure for history taking prior to screening will be necessary. This will increase costs. The experience of the project indicates that routine history taking may not be necessary, but should be obtained in instances when needed.

Recommendation: When conducting school centered screening, either eliminate the history for all children (unless a problem is found) or build in ways to obtain short permission and history forms at the time of school registration and use the periodic screens, school nurse, notes on records, and teacher information to build a history.

Screening Program

Screening may have two major elements--medical (including dental) and developmental (including emotional adjustment). The experience of the demonstration indicated that, although staff can be trained to take part in both types of training, there are advantages to conducting these parts of the screen separately. However, as will be noted in the discussion of feedback, there is an advantage in reporting the findings to teachers and parents on both screens at one time.

There are several factors of the screening process which apply to both medical and developmental screening demonstrations, as well as to any screening program. A discussion of these, with recommendations, follows:

Personnel: The experience of the project affirms the value of using indigenous personnel in all aspects of the program. This is imperative where cultural and language differences exist.

Quality Control: The project experience clearly highlights the fact that several factors interact to determine the quality and outcome of screening and, therefore, require perpetual evaluation and modification: These include:

1. Staff training and periodic review of staff performance seems necessary whether one is employing trained professionals or indigenous workers trained to carry out one or more screening functions. Special training or review training can result in marked changes in findings.

2. Output reviews on a periodic basis, at least annually, seem in order for programs as well as individual staff performing screening duties to detect changes in findings which may occur from any one of several factors: staff training, reduced staff performance, or changes in the population screened, etc.

3. False positives is one index of the quality of screening which does not appear to have been utilized greatly by EPSDT programs. This can result from a number of factors, including careless or overly cautious interpretation of screening findings, poor or inadequate criteria for declaring positive findings, poorly calibrated instruments, physicians' criteria for diagnosis and treatment, etc. False positives cost money and can arouse unnecessary anxiety, trouble, and expense for families and providers. Systematic reviews as indicated above should show rates of false positives for a program as well as for individual staff members and screening procedures as a management tool.

4. Screening edits of all completed forms on a daily basis for reporting findings (negative and positive) on each child are necessary. Systematic editing of all forms by a data clerk is essential for reducing reporting errors and omissions which, themselves, are a quality deficit and increase problems of quality control.

5. Feedback to staff on the above features of quality control is useful for ensuring quality, and this is further enhanced if the screening staff also obtains feedback on what happens to children who go on for diagnosis and treatment.

Recommendation: Each local EPSDT unit should be required to prepare an annual evaluation report specifying the rates of positive findings and false positives for various screening procedures, and perhaps by staff type, and listing the planned changes to help current deficiencies, including staff training and better specification of referral criteria.

Treatment: Treatment, including diagnosis and immunizations, is the fundamental payoff factor for any screening program. These services may be provided either on-site or off-site. Since on-site treatment in EPSDT programs poses a critical problem from one point of view, each of these need and require some discussion.

1. On-site treatment seems fully indicated for a large proportion of the conditions detected by screening. For the most part, these conditions do not require further diagnostic determination, and given the life circumstances of many of the children, few of these conditions would receive any sort of professional attention. To refer them for off-site treatment increases costs, imposes additional effort on the family, and, in many instances, is met with noncompliance. These problems should be avoided by on-site treatment either by a physician or other authorized personnel working under standing orders.

2. Off-site treatment, per se, is not particularly problematic except for getting children to providers. This poses problems even under relatively good circumstances; in rural areas with scant resources, great distances and poor transportaion, the problem is even more difficult. There are, however, two important issues: first, a simple but effective and rapid billing and payment system is needed. A screening program which depends upon external treatment resources must have a network of providers which responds in a timely and effective fashion. Excessive problems with billing and payment impedes the development of such a network. The second problem is obtaining timely and accurate feedback by providers to the screening program. Without such information, a screening program operates in a state of managerial ignorance.

In this project it was found that nurse practitioners and physician assistants under standing orders could handle most of the necessary on-site treatment, but the majority of the moderate to severe conditions had to be treated by specialists at the clinic. The dental problems were particularly difficult to correct until special arrangements were made to get large blocks of time of the dentist to care for the children's dental problems. The regular methods of delivering services on an individualized appointment

basis did not work because parents could not bring their children, and some of the dentists did not particularly care to work with children.

Recommendation: Fund the screening package to a sufficient extent to cover simple on-site treatment by mid-level providers (physician assistants, school nurse practitioners, etc.) under standing orders of a physician. The vision, hearing, dental and cardiac conditions occur in high frequency and generally still require external referral in most health care delivery settings. The rural EPSDT programs (and perhaps all) need the flexibility to make special arrangements with providers to conduct block scheduling of treatment. If this is not possible under the routine vendor payment mechanism, the local units need the flexibility of making contractual arrangements. Perhaps a small treatment fund should be allowed each local EPSDT unit.

Follow-up: If the payoff anticipated from treatment is to be realized, whatever its magnitude may be, children must reach treatment sources. Here, as in the case of outreach, is an enigma of health care behavior. To get children to screening and treatment sites requires more for many parents than informing them and setting up appointments. This is a major justification for on-site treatment, but, as mentioned in the previous paragraph, outside treatment will still be necessary. This project found that, unless strenuous follow-up efforts were conducted within two weeks of the screening, only limited treatment in outside resources followed. Also, the indigenous aides were especially helpful in explaining the problem and encouraging parents to give permission for treatment.

Recommendation: Fund the local EPSDT unit or EPSDT provider of follow-up monitoring sufficiently to conduct rapid monitoring and assistance, including transportation and personal explanation and encouragement. A data system which

will eventually report rates of treatment and provide last resort reminders should be required of each EPSDT unit.

Other Screening Factors: (1) In Chapter 1 of this report, it was emphasized that organizing and operating a comprehensive EPSDT program in a rural area requires mobility, coordination, comprehensiveness, use of indigenous para-professionals and, most important, flexibility to adapt to the alternative methods of outreach and follow-up required when a different value system and notions of time are involved in the child and parent population.

Recommendation: EPSDT units should be allowed maximum autonomy at the local level to meet the objectives of minimizing the presence of untreated medical, dental and developmental conditions present in the population. Rigid planning and schedules to be followed by all are not possible, but sufficient funding (especially at the front-end to get the program started) is required and staff members need to be selected according to their level of creativity and adaptability to new conditions, as well as their sensitivity to cultural differences.

(2) Finally, this was a demonstration project, conducted during an era when most demonstration projects were limited to a three year time period. In order to begin a program that is totally untested, refine it, properly evaluate it, and seek community or statewide funding for it requires a minimum of five years. Just as the project was closing, sufficient data had become available to indicate needed areas of refinement and study. The amount of data collected in such a project requires over a year of careful study once the final results are in and another six months for writing and editing. The first year is a time of experimenting with ways of implementation, the second year involves

a gross refinement of methods, and the third year is the first fully operational year (in a manner which the project would be proud to sell to the public), but midway in the third year the project must begin to wind down as the staff must seek new jobs elsewhere. The result is traumatic for all involved, and requires impossible deadlines for analysis and writing.

Recommendation: Demonstration projects are needed when an operational procedure has never been tried. A wealth of operational lessons and evaluation data can result and policy makers at the local, state and federal level can benefit, but the funding for such complex social interventions must be expanded to a five year minimum to get the full potential out of the project and to provide time to increase the probability of community funding.

Appendix A

Rules for Assigning Index Scores

Intellectual Functioning	A_1, A_2
Visual-Motor Perception	A_3
English Language Comprehension	A_4
Emotional Adjustment	A_5

Appendix A_1

Rule for Assigning Index Scores of Intellectual Functioning by Joint use of Wechsler* Subtest Scaled Scores and the Human Figure Drawing Scores

If number of HFD Positive Indicators is:	And Wechsler* Subtest Scaled Score is:	The index for Intellectual Functioning is:
5 or more	any score	9
0 through 4	18 or above	9
4	below 18	8
0 through 3	16 or 17	8
3	below 16	7
0 through 2	14 or 15	7
0 through 2	12 or 13	6
2	below 12	5
0 or 1	9 through 11	5
1	below 9	4
0	7 or 8	4
0	5 or 6	3
0	3 or 4	2
0	0 through 2	1

* Used only for WPPSI and WISC Information Subtest in 1973-74 and the Block Design Subtest in 1975-76.

Appendix A_2

Rule for Assigning Intellectual Functioning Index Scores On the Basis of Draw-A-Person Test Scores

Index Score is:	If the Chronological Age (CA) Mental Age (MA) Difference is:
9	MA 24 or more months above CA
8	MA 18-23 months above CA
7	MA 12-17 months above CA
6	MA 6-11 months above CA
5	MA 5 months above to 5 months below CA
4	MA 6-11 months below CA
3	MA 12-17 months below CA
2	MA 18-23 months below CA
1	MA 24 or more months below CA

Note: Some children were given the DAP and either the Wechsler Information or the Block Design Subtests. A joint rule for assigning an index score was used as follows*:

If WISC Scaled Score is:	Then Index is At least:
14-19	7
7-13	4

* For example, if a child scored 14 on the WISC and had a DAP of 18-23 months above his CA, he received an Index Score of 8; alternatively, the child with a DAP MA of 6-11 months below his CA and a WISC of 15, he received an Index Score of 7.

Appendix A_3

Rules for Assigning Index Scores of Visual-Motor Perception on the Basis of Bender Error Scores

AGE (in months)

Index Score	60-65	66-71	72-77	78-83	84-89	90-95	96-101	102-107	108-131
9	5	1	0						
8	6,7	2,3	1	0	0	0	0	0	0
7	8,9	4,5	2,3	1					
6	10,11	6,7	4-6	2-4	1,2	1,2	1,2	1	1
5	12-15	9-11	7-9	5-7	3-6	3-6	3-5	2,3	2
4	16,17	12,13	10-12	8,9,10	7,8	7,8	6,7	4,5	3
3	18,19	14-16	13-15	11,12	9-11	9,10	8,9	6,7	4,5
2	20-23	17-19	16-18	13-16	12-14	11-13	10-13	8-10	6-8
1	24,25	20+	20+	17+	15+	14+	14+	11+	9+

Appendix A_4

Rules for Assigning Index Scores for English Comprehension on the Basis of Wechsler Vocabulary Scaled Scores or WRAT Reading Level Discrepancy Scores*

Wechsler Vocabulary Score	Index Score	WRAT Reading Level	Index Score
18 or above	9	24 or more months above grade	9
16 - 17	8	18-23 " " "	8
14 - 15	7	12-17 " " "	7
12 - 13	6	6-11 " " "	6
9 - 11	5	5 months above - 5 months below grade	5
7 - 8	4	6-11 months below grade	4
5 - 6	3	12-17 " " "	3
2 - 4	2	18-23 " " "	2
1	1	24 or more " "	1

*Note: The transformation to index scores was independent for each test, not a joint assignment.

Appendix A_5

Rules for Assigning Index Scores on Emotional Adjustment by Joint Use of Bender Indicators and Negative Indicators on the Human Figure Drawing*

A. Rule for Younger Children: Grades 2 and Under

If Number of HFD Negative Indicators is:	And the Number of Bender Indicators is:	The Index for Emotional Adjustment is:
0	0	6
1	0	5
0	1	5
1	1	4
0,1	2	3
2	0,1,2	3
0,1,2	3	2
3	0,1,2,3	2
4 or more	any number	1
any number	4	1

B. Rule for Older Children: Grade 3+

If Number of HFD Negative Indicators is:	And the Number of Bender Indicators is:	The Index for Emotional Adjustment is:
0	0	6
1	0,1	5
0	1	5
2	0,1	4
0,1,2,3	2	3
3	0,1	3
4	0,1,2	2
0,1,2,3,4	3	2
5	any number	1
any number	4 or more	1

*Koppitz HFD indicators used by the project were: assymetry of limbs, slanting figure, tiny head, tiny figure, short arms, long arms, big hands, hands cut off, grotesque monster, no eyes, no mouth, no body, no legs.

APPENDIX B

Bender Gestalt Test Scores

Bender Gestalt Test Scores for 5 - 10 Year Olds
by Ethnicity with Koppitz Norms*

Age	Norm Mean	Norm Stnd. Dev.	Navajo		Spanish		Anglo		Total	
			N	Mean	N	Mean	N	Mean	N	Mean
5	13.6	3.61	85	13.5	43	14.5	16	13.4	144	13.8
5½	9.8	3.72	91	11.7	48	12.7	19	11.2	158	11.9
6	8.4	4.12	74	10.4	45	9.7	12	7.4	131	9.9
6½	6.4	3.76	63	7.9	49	7.2	23	7.0	135	7.5
7	4.8	3.61	71	6.5	23	5.6	14	6.0	108	6.2
7½	4.7	3.34	58	6.0	30	5.1	8	4.4	96	5.6
8	3.7	3.60	39	6.6	31	5.8	11	4.8	81	6.0
8½	2.5	3.03	47	40	29	4.4	11	3.8	87	4.1
9	1.7	1.76	38	4.7	15	4.1	4	5.0	57	4.6
9½	1.6	1.69	30	3.5	5	3.8	1	0.0	36	3.4
10	1.6	1.67	26	3.0	6	5.3	-	-	32	3.4
10½	1.5	2.10	10	2.8	3	6.0	1	2.0	14	3.4
Total Cases			632		327		120		1,079	

*Koppitz, E.M., The Bender Gestalt Test for Young Children (New York: Grune and Stratton, Inc., 1963) p. 188.

APPENDIX C

Description of Problems Referred

Description of Problems Referred

Type of Problem	Reason for referral*	Number Referred
Infective and Parasitic Diseases, + Tine Influenza, Thrush Ringworms, Scabies Gastroenteritis (acute), warts, lice	Warts	5
	TB	4
	Impetigo	1
Diseases of Thyroid and other Endocrine glands	Thyroid enlargement	1
Nutritional and metabolic conditions	Underweight	2
Obesity	Obesity	1
Anemias and other Diseases of the blood and blood-forming organs	Low height (34/35)	6
	Anemia - 8	6
Psychoses, Neuroses, Personality and other mental disorders	Learning difficulty	3
	Slow learner	1
	Disturbed child	1
Vision problems: refractive errors, and blindness, astigmatism, hyperopia, myopia, eye strain	Refractive error	231
	Failed plus lens	39
	Strabisma	1
	Broken glasses	4
Eye problem, diseases, strabismus, conjunctivitis, erotropia-cross-eyed	Trachoma and Conjunctivitis	21
	Conjunctivities	13
	Myopia	1
	Cyst - rt eye	1
	Strabismus	2
	Hyperopia	1
Otitis Media and other Ear conditions	Abnormal audiogram	44
	Malformed ear canal	1
	Perforated LTM	21
	Pus in ear	4
	TM perforated	1
	Sore left ear	1
	Right tympanotomy	1
	Ear trouble	1
	Abnormal impedance	7
	Foreign body in ear	1
Hearing Loss	Abnormal audiogram	35
	Hearing loss	10

*Descriptions in this column are those employed by screeners on referral sheets.

Other heart & circulatory conditions, heart murmur	Evaluation, exam	3
	Systolic murmur	60
	Heart murmur	100
	Probable aortic malformation	1
	Ejection murmur	2
Upper respiratory tract diseases, bronchitis (acute, rhinitis tonsilitis, chronic sinusitis)	Throat infection	2
	Strep throat	2
	URI	4
Dental caries	Dental Check for caries	725
Other dental problems	Teeth in poor alignment	3
	Toothache	1
	Loose molar	1
	Broken tooth	1
	Abcess upper incisor	1
	Dental evaluation	1
Lower G. I. tract : other	Liver tender	1
Genitourinary conditions, phimosis, tight foreskin	Urinary problem	2
	Glomerular nephritis	1
	Pain when urinating	1
	Undescended testicle	2
	Blood in urine	1
Dermatological problems, impetigo, diaper rash, ingrown toe or fingernail	Lesion on scalp	1
	Folliculitis	3
	Skin	1
Orthopedic problems	Toes in	3
	Curvature of spine	3
	Gait	1
	Scoliosis	1
	Toes out	1
Congenital anomalies, undescended testicle	Undescended testicles	1
	Right congenital ear defect	1
	Congenital anomalies	1
Symptoms and ill-defined diseases, epistasis	Hematuria	6
	Sugar in urine	2
	Lethargic	1
	2 + protein in urine	1
Enuresis	Enuresis	3
Injuries	Puncture wound, right foot	1
Other	Abnormal measurements	31
	Low weight/height for age	25

APPENDIX D

Rates of Findings on Original Screens

Selected Procedures

Rates of Findings on Original Screens by Selected Procedures, by Age, 1974-75 Only

Age in Years	Nose & Throat N	Nose & Throat Percent Positive	Skin N	Skin Percent Positive	Hematocrit N	Hematocrit Percent Positive	Urinalysis N	Urinalysis Percent Positive	Vision N	Vision Percent Positive	Dental N	Dental Percent Positive
3	18	5.6	18	0.0	18	0.0	15	0.0	7	0.0	18	38.9
4	90	8.9	90	1.1	80	1.3	70	4.3	46	19.6	90	51.1
5	173	14.5	173	4.0	155	0.6	164	4.9	147	26.6	175	38.4
6	174	19.5	174	4.0	155	1.2	168	3.6	170	25.9	174	40.2
7	164	11.6	164	1.8	152	0.0	162	4.9	163	14.2	165	36.9
8	141	11.3	141	.7	132	0.0	138	0.7	140	20.0	141	29.1
9	129	7.8	129	6.3	122	0.0	127	5.5	127	19.7	129	24.8
10	109	3.7	109	.9	103	0.0	107	5.5	107	13.1	111	27.0
11	92	0.0	92	0.0	91	1.1	92	4.4	91	8.8	93	26.9
12	78	1.3	78	0.0	73	0.1	76	7.9	79	17.7	80	18.8
13	23	0.0	23	0.0	21	0.0	19	15.8	28	25.0	31	29.1
14									20	20.0	14	6.4
15+											53	81.1

APPENDIX E

Case Study

Case Study--A Child with Hearing Loss

This is a case study of one child who was detected on an EPSDT screen as having an abnormal audiogram. The study follows the child from the original screen through tympanoplasty and follow-up home care.

Screening:

The child was originally screened in 1974 and subsequently referred to ENT Clinic, where the otolaryngologist confirmed a large subtotal perforation of the left tympanic membrane and a significant hearing loss in the left ear. At this time, he recommended a tympanoplasty, investigation of potential funds for hospitalization, and a home visit to inform the parents as well as obtain permission. The child then moved from the area and was missed in the 1975 screen.

The next encounter was in 1976 in the screening of a private school. This screen again found a large left subtotal perforation with significant hearing loss and no peak pressure in the left ear on impedance testing. She was again referred to ENT Clinic.

Diagnosis:

The child was seen in April, 1976, by the otolaryngologist, who found her ears infected and draining. They were cleaned and Cortisporin drops prescribed. Tympanoplasty was explained to the mother at this time. She returned in May 1976 at which time her ears were found to be clear of active drainage and recommendation was made for tympanoplasty.

Case Monitoring:

A home visit was made by EPSDT staff. The chart "You and Your Ears" was

used to explain to the family in Navajo both the reason for the child's hearing loss and the necessary operative procedure. The complications and anesthesia were also explained. The operative permit was read to and signed by both mother and father.

An appointment for surgery was set up through Cuba Health Center, and the date for this surgery was given to the family. It was decided that the mother would accompany the child and she would find her own accommodations.

Treatment:

On the day before surgery, the child was scheduled for an office visit at the otolaryngologist's office in Albuquerque. He explained the operation to the mother as a type I tympanoplasty repair, which is done by placing a graft over the perforation in order to create a closed middle ear space. This would be done to avoid future risk of bacterial contamination, as well as to restore as much hearing as possible.

The otolarynogologist examined the child's ears to visualize the entire performation, remove cerumen, and to check for infection. An audiometric evaluation was also done to assure that the loss was conductive and not perceptive in nature. Sensori-neural (perceptive) hearing loss is measured by testing reception through bone conduction. This is measured when a stimulus is applied directly to the mastoid process. At this time, the child had a 25 decibel conductive hearing loss.

A brief physical exam was given to detect any infection or other physical conditions. A check was made of neck, heart and lungs, abdomen, etc. The physical exam was negative, and the processing of admission papers for a local hospital was initiated.

After signing admission papers and making financial arrangements (in this case a Medicaid authorization was requested and previous arrangements had been made), the child was taken to the laboratory for a CBC, UA and chest X-ray, as per admission orders. She was admitted to her room in the Adolescent Care Unit.

Pre-op medications were given at 6:00 a.m. on the day of surgery and at 7:00 a.m., as the child was taken into the operating room area. General anesthesia was administered and a Phiso-Hex scrub was done to the ear area. An incision was made by folding the ear forward and incising along the crease of the ear approximately two inches. This allowed direct entry into the external canal. Cauterization of all blood vessels was done and a segment of the temporalis fascia removed. This graft was then prepared to the correct thickness and left to dry. (The graft was a piece of transluscent fascia approximately 1 mm. thick.) After drying, the graft was trimmed to desired shape and diameter, about the size of a nickel.

The graft site was then prepared by exposing the areas surrounding the perforation and outer canal. All debris was removed and the site readied for placement of the graft.

The graft was then put in place and left to adhere to the prepared area. Gelfoam packs were placed next to the new graft and the entire area from graft to outer canal was very gently packed with Gelfoam. A gauze bandage was used as outer dressing and a head bandage applied. The entire operation took one and one-half hours.

The child was brought into the recovery room with oxygen and an air-way in place. She was given Ampicillin immediately. She remained in the recovery room for two hours, until she was alert and responsive.

The day following surgery the child rested but was ambulatory. She tolerated a semi-soft diet and was eating a regular diet by evening. The head bandage was

removed on the second post-operative day, and she was discharged from the hospital.

Follow-up:

The following instructions were given to the family when the child returned home:

1. Keep water out of the ear by not washing the child's hair for two weeks, not swimming for two months, and being careful when washing the face that cotton balls are in place.
2. Wash hands and very gently replace cotton balls (package of sterile cotton balls left with family).
3. Prevent colds by wearing shoes and jackets and wearing a scarf in the wind.
4. Restrict activity for a few days.
5. Don't touch outer or inner ear. Don't remove packing!!
6. No nose blowing for two weeks.
7. Take medication (Ampicillin 250 mg.) at breakfast, lunch and dinner (3 times a day) to prevent infection.
8. Return to see physician in one week.

Conclusion:

The child progressed well and return clinic visits confirmed successful surgery. Marked improvement in hearing resulted at all frequencies tested and the post-operative audiogram showed hearing well within the normal limits for ordinary conversation.

APPENDIX F

Estimated Incremental Screening Costs

Estimated Incremental Screening Costs for Each Screening Procedure

Step	Time	Person	Equipment (Estimated life in parenthesis)	Supplies	Cost
Hematocrit	5 min.	LPN $4.06 per hr.	1 centrifuge @ $289.00 1 wastebasket @ $2.50 1 tube reader @ $3.25 (10 years)	1 bottle alcohol (2 per year) 100 bandaids (1 per child) 400 cottonballs (1 per child) 12 clay sealers (12 per child) 100 lances (1 per child) 200 hot tubes (2 per child)	$ .39 1.80 10.70 7.40 14.55 3.50
Vision	5 min.	Aide $2.45 per hr.	illuminated chart @ $109.39 (5 years) 2 cards @ $5.50 (5 years) = $11.00 plus lens @ $13.20 (5 years)		
Physical Exam	10 min.	Practitioner (has own equip.) ann. $13,500 6.49x1.3x1.2+ 2 weeks' training	lamp @ $26.95 (10 years) otoscope @ $108.45 (10 yrs.) 2 screens @ $160.00 (3 yrs.) wastebasket @ $2.50 (3 yrs.) ear basins @ $2.50 (10 yrs.) ear syringe @ $19.09 (3 yrs.)	1000 cotton applicators (1 per child) 1000 tongue blades (1 per child)	$ 2.50 45.75
Urine	3 min.	Aide $2.45 hr. (3.32)	None	100 labsticks 250 UA cups	.15 ea. .104 ea.
TB	3 min.	R.N. or L.P.N. (2/3) (1/3) (4.068) 5.42 (4.579)	None	1 bottle alcohol @ .39 (2 per yr.) 4000 cotton balls - $10.70 (1 per child) 100 syringes w/needle - $9.88 (1 per child)	.0006 ea. .0027 ea. .0980 ea.
Hearing	impedance 5 min.	Technician $2.45 per hr.	otoscope @ $60.00 impedance bridge $1,945 (8) audiometer @ $350 (8) training (Indian Health Service pays) but on payroll (3 weeks)	None	

Step	Time	Person	Equipment (est.'d life in paren.)	Supplies	Cost
Height and Weight	2 min.	Aide $2.45 hr. (3.32)	scale @ $91 (9 years)	None	
B.P.	2 min.	R.N. or L.P.N. $3.00 hr.-up	None	None	
Temperature	1 min.	R.N. or L.P.N. (2/3) (1/3) $3.00 per hr.-up	None	Disposable Thermometers (1 per child)	$.08 ea.
Immunization w/Records	7 min.	R.N. or L.P.N. (2/3) (1/3) $3.00 per hr.-up	None	Record	.02
Immunization wo/Records	15 min. 15 min. 30 min.	R.N. or L.P.N. $3.00 per hr.-up Clerk @ $2.45 hr.	None	Folder Xerox @ 5¢ (4 copies per child)	.07 ea. .20

APPENDIX G

The Record System and Data Flow

The Record System and Data Flow

The evaluation of the levels and adequacy of project activity required a data collection and analysis system which captured the major elements of data for both project management and evaluation analysis. This appendix starts with a discussion of the basic requirements when the system was first developed; describes the basic forms used to capture information from the medical and developmental screening; reviews the computer file developed for carrying out the analysis of medical data from the system; and ends with a discussion of the lessons learned.

At a minimum, there were five things the system was to do:

1. The medical data had to be collected in such a way that it could be put into statistical tables comparable to the other EPSDT demonstration projects in San Antonio, Contra Costa County California, and Washington, D.C.

2. The forms had to be sufficient to meet the informational needs of the CAHS clinics, the schools, and project staff--all of whom wanted to minimize paper work while collecting useable data.

3. The system had to provide capability for tracking problems from referral to completion of treatment.

4. The system had to permit comparison of screening results on original and periodic screens for the same children.

5. The medical data had to be linked to the developmental data to compare medical and developmental screening results.

The Data Forms

The child and family history components that were to be a part of all four demonstration projects were deleted from this system because of the difficulties in obtaining the histories. This meant only two forms were needed for the medical aspects--a screening form and a problem referral sheet.

The Medical Screening Form

In order to minimize paper work and ensure accurate evaluation data, the medical screening form was designed to be used both as the medical record of the screening event and also as a data collection tool. Therefore, the screening procedures listed on the form reflect those items covered during the examination. A copy of this form and the instructions used by project staff are included as Attachment 1. Findings at each screening step were recorded on the form as the child progressed through the screening procedures. After the screening session, the data technician, aided by the nurse, would complete the form, sending one copy to HSRI for computer entry, retaining one copy for the

project and sending one to the CAHS and one to the school. An examination of Attachment 1 shows that, in addition to the screening findings, the form called for:

1. An indication as to what screening step was required for each child. This allowed computation of the rate of completed screens.

2. An explanation of failure to complete a given screening step. This served to alert management to the need to schedule the child for a screen at a later date.

3. Identification of the staff person conducting each screening step. This was used to determine if the lowest possible skill level was being used for a given procedure and to identify rates of findings by staff member and skill level.

4. The results of each screening step and the need for further action. This provided data for calculating rates of positive findings and yield of each screening procedure.

5. A healthiness rating made by the person giving the unclothed physical examination. The nine-point scale allowed a gross measure of the child's health status to explore its usefulness for determining follow-up priorities.

6. A description of the immunization status of each child at the time of screening.

The Patient Referral Form

The patient referral form is shown in Attachment 2 along with instructions for completing the form. The form was completed by the project staff for each problem for which a child was referred for diagnosis and treatment and was sent to the referral source. The referral person recorded the diagnosis of the problem on the form, indicated whether the problem was acute or chronic, and indicated whether it was symptomatic or asymptomatic. The referral person also rated each problem as mild, moderate, or severe; noted what treatment was provided; indicated what further treatment was needed; and the form was returned to the project. Upon return, the bottom part of the form was used to indicate the current status of the problem (i.e., resolved or not resolved), and the cost of diagnosis and/or treatment was recorded on the form.

One copy was sent to HSRI at the time the problem was referred. After the treatment results were returned to the project, the results and costs were recorded on the copy of the form originally retained by the project. This copy was then forwarded to HSRI for data processing. The purpose of the form forwarded to HSRI at the time of referral was to allow a computer driven tickler system for follow-up of all problems and children referred for diagnosis and treatment. This system was not fully operational until the second year of

medical screening, but was successfully used to ensure that children with problems were not overlooked. However, when follow-up was initiated immediately following screening, it was necessary to develop a manual system for documenting follow-up and tracking. This manual system proved to be the most desirable process for local use and is still in operation today with the addition of a McBee card file.

Computer File

The system developed for analysis of the data was more complex than would otherwise be required for routine EPSDT evaluation. The complexity came about for several reasons. The data file had to be sufficiently compatible with that of three other demonstration projects to permit access by use of a generalized statistical package (e.g., the Statistical Package for the Social Sciences - SPSS) and to allow simultaneous examination of several variables, e.g., comparison of findings on the same children for original versus periodic screens. At the same time, the system had to meet the unique requirements of the project.

There are two major but related data processing activities involved in the medical data system:

1. the statistical analysis file and

2. the data base file.

In the following discussion, the statistical file and analysis aspects will be discussed first and then the way data is entered and stored before building the statistical file will be presented.

The problem in building a generalized statistical file is that there are multiple levels of analysis. In some instances, the evaluator is interested in child or screen oriented results, such as the number, age, sex, ethnicity, and children screened (either original screens or periodic screens) and the rate of findings on each screening step (original versus periodic perhaps). In other instances, the focus is on the problems referred in terms of the rate of false positives, the rate of shows for treatment, the number of specific conditions found (perhaps according to original versus periodic screen, age, ethnicity, etc.). Because of this, the statistical file must be structured to consider each problem, but have the capability of looking also at screens. Therefore, a "record" was created for each problem, but also contained all the screening data for the screen from which that problem was referred.

To illustrate the way HSRI data processing solved this, take three children as shown in Attachment 3. Suppose that one child has had two screens, with two problems on each screen and two other children have each had one screen with no referrals. Therefore, if problems were to be analyzed, (e.g., rate of treatment by condition), each "record" (representing a problem) in the data file would be used in the analysis. If only screens were to be analyzed, the first record for each screen would be selected by selecting the "first in series" flag (set to one if it was the first record for that screen) because the structure was set up that the first record for any set of problems would contain the screen results. If only original screens were desired, only records that were "first in series, first occurrence" (i.e., first time a record for that child appeared), "screen count greater" than zero, and first

screen (in the "screen sequence" block) would be selected from the computer tape. Other variables than those shown in the example were included on the actual tape to capture the information from each form (the SPSS variable list is given in Attachment 4). Access of this statistical tape and the SPSS analysis was done via a cathode ray tube terminal to obtain any required cross-tabulations.

The second part of the data processing component was building the data file from the data submitted by the project on the medical forms. This was done throughout the project to prevent the slippage of data accuracy and to provide more timely feedback. Each time a new set of data arrived at HSRI, a data processing "cycle" was completed in order to update the data that had been received previously and placed on a master file which was stored on tape.

Processing of the data prior to building the statistical file described was a three stage batch mode process[1] as follows:

Stage 1: Entry and Editing. Data were coded on special code sheets, key-punched and computer edited for obvious out-of-field codes (such as age over 21).

Stage 2: New File Creation. Each time a new batch of data was edited and ready for input, the previous master file was sorted and the sufficient disk space was allocated to allow insertion of the newly received screening or problem sheets. During the process of determining disk space needs, a computer check was made to match name and identification number to determine whether or not the new screening sheet represented a new child or a periodic screen of an existing child. It often happened that the new screening sheet would have the same I.D. number as an existing child record on the file, but the name would be different. This was always a problem in all projects. Finally, a phonetic check was built in wherein if the last name sounded the same and the first two letters of the first name sounded the same, the name and number were assumed to match. If no match could be found, a new record was created. If it was close, but not certain, the whole record was rejected for manual editing.

Accordingly, certain rejection criteria were developed. Manual review of a child's total file had to occur if any of the following events occurred:

1. If for any record, the name on the data entered in the computer data did not match that on file. The match did not need to be exact and was determined by a combination of tests including exact match, phonetic match and first four character match.

2. If there was a duplication of dates for two different screening sheets.

3. If problem referral data were entered for which there was either no record at all of the child, or no record of a screen under that child's number.

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[1] In current HSRI applications, on-line data entry is utilized.

4. If the same problem sheets were entered twice for the same child and the diagnosis codes were identical, the system assumed it was the same problem and ignored the new data.

5. If treatment or resolution data were entered but there was no problem (identified by a unique number code) yet in the computer file.

The information from those documents that did not get rejected were then allowed to be inserted into the appropriate places in the master file structured like that shown in Attachment 5.

Stage 3: Creation of the Statistical Tape. Periodically, as the data analysis was required, the information from the files shown in Attachment 5 was combined into the statistical tape described earlier.

The extensive editing and data maintenance processes described above grew out of experience with earlier EPSDT studies based on other state and local data systems containing many inaccuracies arising from inadequate editing. However, wider experience has made us think that the system used here was too cumbersome for routine use in projects of this size, as will be pointed out in a later section.

The Developmental Screening Forms

The developmental forms were tailored more to describe the screening results than to conduct a management tracking system. Therefore, the forms included as Attachment 6,were used to capture the results of the developmental testing. Since there was no formal data base maintenance system set up that was similar to the medical data base, and since the project changed the forms to add and delete items several times, the creation of a statistical file for developmental screening was more difficult. The first forms used are shown in Attachment 6. Since different tests were given to children in grades kindergarten through second than were given to third grade, there were two forms: one form (A) for grades K-2, and one form (B) for grade 3. The critical items from both of these forms were summarized into one statistical tape. The SPSS variable list for this is shown as Attachment 7.

As each child's developmental screening was completed, one copy of the form was sent to HSRI. The other copy remained in the child's record for project staff use.

Attachment 8 contains the developmental form used during the last year of the project. The forms were revised to include a section in the first page in which the developmental screening results from previous years was summarized in terms of needing a rescreen, or needing a diagnosis. This provided the project staff with a historical perspective on the child's development before entering the screening process.

Lessons Learned about the Record System

As a result of the experience with the Cuba project and other EPSDT demonstrations, HSRI moved in several different directions in the processing of data when a requirement for detailed research data exists. A system of on-line data entry and simultaneous editing is necessary so the data entry personnel can quickly review the child's entire file to determine new data fits into the file. Many unique possibilities occur in the generation and separation of screening findings; thus, it is difficult to produce computer algorithm that anticipates all critical events and it is clerically too time consuming to go back to the child's complete paper file to determine the previous activity and current status in the system. Along with this, forms should be carefully pretested at least six months before computerizing. In the Cuba Project, the decision to use a computerized system came too late to allow a meaningful pre-test period. Since only problem referrals had a formalized tracking procedure in this project, it was difficult to document the outcome of all positive findings (especially those referred to the school nurse). Finally, attention must be paid to developing internal flow of records procedures whereby the data technician monitors the information status of all records.

When the requirement is not so detailed (one wants to monitor just the basic rates of findings and follow-up), a more simplified system is needed for paper flow to and from the computer. In this project the computer was initially expected to do too much that could have been done more simply by a data technician.

Conclusion

A data system (either computerized or on McBee cards) for evaluation of local EPSDT projects is necessary for analyses useful for managerial decision making. Without such a system, the large number of variables and cross-tabulations are required (e.g., looking at results by age/staff/etc.), are too excessive for manual analysis. However, for an ongoing project, if a computer is to be used, the flow of paper to and from the computer needs to be kept at a minimum,and forms should be pre-tested for at least six months prior to the beginning of actual data collection. If sophisticated analyses for research purposes are required, then an on-line data entry and editing system is essential for accurate data entry and detailed analysis.

ATTACHMENT 1

Checkerboard EPSDT Medical Screening Examination
Forms and Instructions

CHECKERBOARD EPSDT SCREENING EXAMINATION

Child's Name _____ (Last) _____ (First) Child Number _____ (Family) _____ (Child)

School _____ Grade _____ Date of Birth _____ (Mon Day Yr) Age _____ (Yrs.)

Examination Date _____ (Mon Day Yr) Parents Name _____ ✓ if parental permission given ☐ If partial, list specifics _____

Ethnicity ☐ Sex ☐

✓ if not req.	Screening Step	Done By	✓ if problem to be handled by: referral	✓ if problem to be handled by: nurse	Results (If step not done, note reason)	Action
	Ears					
	Eyes					
	Nose and Throat					
	Skin					
	Heart					
	Respiratory					
	Orthopedic					
	Other Physical					
	Hematocrit					
	Trachoma Check					
	Urinalysis (dipstick)					
	T.B. Test					
	Hearing					
	Vision					
	Dental					

Height _____ _____ % Weight _____ _____ % B.P. _____ Pulse _____

HEALTHINESS RATING
(Circle most appropriate rating)

Current	1	2	3	4	5	6	7	8	9
Predictions: In 6 months, all problems treated	1	2	3	4	5	6	7	8	9
Predictions: In 6 months, without any treatment	1	2	3	4	5	6	7	8	9

IMMUNIZATIONS
(Check if current)

DPT ☐ Measles ☐

OPV ☐ Rubella ☐

How many contacts will be required to make child current?

Were records checked? ☐ Yes ☐ No

ITEMS: INSTRUCTIONS

1. Child's Number: Place child's unique number in the boxes.
2. Child's Name: Last name is printed in first set of boxes; First name is printed in second set of boxes.
3. School: Print the name of the school in which the child attends.
4. Grade: Use the grade in which the child is presently enrolled.
   a. Homestart --- HM
   b. Headstart --- HD
   c. Kindergarten --- KG
   d. Beginners --- BG
   e. First --- 01
   f. Second --- 02
   g. Third --- 03
5. Date of Birth: For month - use the numeric value - 01 = January, 02 = February,..... 12 = December; For the day - is 01 to 31; For the year - use the last two digits of the current year.
6. Age: years of child's age - Subtract birthdate from screening date.
7. Examination Date: This is the date of the actual examination. Follow the procedure given for Date of Birth.
8. Father's Name (Caretaker): Print in the name of the father or caretaker.
9. if parental permission given: If the permission is partial, indicate. (Which tests or why)
10. if not required: Any test not required by the child for such reasons as age or because the test was recently given.
11. Done by: The person performing the screening step indicates that it was completed by using the appropriate number assigned to each person doing any screening.

    If the step is not completed, then the reason why it wasn't performed is written on the line under the column heading RESULTS. Such as:
    1. Staff/equipment not available; failed
    2. Uncooperative child
    3. other
12. if problem to be handled by: Since all findings do not initiate a problem sheet, it is necessary to distinguish if the suspected problem is handled by referral or by the nurse.
13. Results: This line is used to indicate the findings of the screening step. As indicated above in No. 11, it is also used to note the reason a step was not performed.
14. Action: Order by nurse or doctor.
15. Height, Weight, B.P., Pulse: The results of these screening steps are recorded and the percentile of the height and weight.

Rating a child from 1 - 9. A child rated 9 is in a perfectly healthy condition. A child rated 7or 8 has no observable disease, or only that which is brief and self limiting (may include dental caries)**

17. Immunization: Check if the child is current. If not current, indicate the actual number of contacts needed to make the child current for his age. (If there is no record, what is the procedure?).

SCREENING PERSONNEL

1. Data Technician --------- Ordering and filling out information steps 1-8
2. PA and/or PNP ---------- Physical Exam
   a. ears
   b. eyes
   c. nose and throat
   d. skin
   e. heart
   f. respiratory
   g. orthopedic
   h. other physical
   i. trachoma check
3. LPN and/or RN ---------- a. PPD
   b. Hematocrit
4. Aide ---------- Impedence Bridge (Hearing) ***
5. Aide ---------- Dipstick
6. Aide ---------- Height and Weight
7. Aide ---------- Vision
8. Aide ---------- Blood Pressure
9. Hygienist ---------- Dental

DESTINATION OF SCREENING FORMS:

1. White copy ---------- RRI
2. Yellow copy ---------- School Nurse
3. Pink copy ---------- EPSDT file
4. Gold copy ---------- will not be used, additional copies needed will be xeroxed.

** Refer to attached form.

*** Chart designed and worked up by Sylvia Olona

GUIDELINES FOR DETERMINING HEALTHINESS RATING

1. Compare each child to the general population of children, not just those from the target population.
2. Rate healthiness to reflect the total health picture, considering numerous problems found in a child as having the effect of lowering the rating you would give any one of those problems.
3. Rate children having permanent uncorrectable disabilities according to their general health level. Consider adjustment to the disability and degree of rehabilitation achieved as reflective of healthiness.
4. Use the categories listed below, together with their definitions and clinical examples only as guidelines in determining where on the continuum of health (1-9) a child falls.

Unhealthy (1-2) — Has life threatening problem if remains untreated

- Cyanotic heart murmur
- Bacterial pneumonia
- Severe uncontrolled diabetes
- Severe failure to thrive (psychosocial origin)

Moderately Unhealthy (3-4) — Limited in ability to learn, play or perceive until somewhat difficult correction is accomplished, e.g.,

- Anemias below 28 HCT
- Severe visual or hearing loss
- Mental or motor development delays
- Malnutrition
- Severe obesity

Moderately Healthy (5-6) — Requires a slight change in life style or relatively simple medical control or correction, e.g.,

- Urinary track infection
- Unbilical or inguinal hernia
- Ringworm with secondary infection
- Impetigo
- Hepatitis
- Intestinal parasites
- Anemias, 28-33 HCT
- Asthma
- Tonsillar hypertrophy
- Mild hearing or visual loss
- URI with otitis media

Healthy (7-8) — Has no observable disease, or only that which is brief and self limiting (May include dental caries).

- Mild URI without otitis media
- Few dental caries

Superior Health (9) — No observable disease. Exhibits evidence of positive health habits. Is alert and has good muscle tone. The "picture of health".

ATTACHMENT 2

EPSDT Patient Referral Notice Forms and Instructions

EPSDT PATIENT REFERRAL NOTICE

Child's Number ☐☐☐☐☐ ☐☐ Child's Name Last Name ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ First Name ☐☐☐☐☐☐☐☐☐☐

Parent's Name_____ Address_____

Referral Date mo. day yr. ☐☐ ☐☐ ☐☐ School_____ Grade____ Age ☐☐ Birth Date mo. day yr. ☐☐ ☐☐ ☐☐

☐ Previously Unknown ☐ Known, not under care ☐ Previously under care ☐ Check if non-screening finding

REASON FOR REFERRAL:

Referred to_____

Signed_____

REFERRAL TREATMENT SUMMARY

Date_____

Did you confirm existence of a problem? Yes ☐ No ☐

What is your diagnosis of this problem:

Is the diagnosed condition:

Acute ☐ Symptomatic ☐
Chronic ☐ Asymptomatic ☐

Seriousness scale:

1 2 3 4 5
Mild Moderate Severe

Did you treat (or give counseling for) this problem? Yes ☐ No ☐

If Yes

- ☐ Condition resolved this visit or presumed resolved without further contact
- ☐ Condition not resolved, but maximum benefit attained
- ☐ Condition still under my treatment, further visits required
- ☐ Condition treated and referred to another practioner/specialist

If no, why?

- ☐ Referred to another practitioner/specialist
- ☐ Patient's family refuses treatment
- ☐ Services not available
- ☐ Not covered under program funds
- ☐ Not medically feasible

FOR EPSDT USE ONLY

Follow-Up Status

- ☐ Condition resolved on subsequent visit
- ☐ Condition not resolved on subsequent visit, but maximum benefit obtained
- ☐ Condition referred for additional treatment
- ☐ Patient on long term treatment plan

Problem Inactive

- ☐ Child did not go to doctor
- ☐ Child did go to doctor, but did not finish treatment plan

Reasons

- ☐ Child moved
- ☐ No longer eligible
- ☐ Family refused
- ☐ Program policy
- ☐ Program time limits
- ☐ No show, reason unknown
- ☐ Other (specify) _____

Total costs for this problem: ☐☐☐.☐☐

Date_____

ITEMS:

1. Child's Number: Place child's unique number in the boxes.
2. Child's Name: Last name is printed in the first set of boxes; First name is printed in second set of boxes.
3. Referral Date: The first two boxes are used to identify the month, the second two boxes are used to identify the day, The last two boxes are used to identify the year. Use the same procedure as Item 5 of the Screening Form.
4. School: Print the name of the school which the child attends.
5. Parents Name: Print the child's parents or caretakers name.
6. Address: Print the parents or caretakers address.
7. Grade: Use the grade in which the child is presently enrolled. Follow the same procedure as Item 4 of the Screening Form.
8. Age: Years of child's age - follow the same procedure as Item 6 of the Screening Form.
9. Date of Birth: Follow the same procedure as Item 5 of the Screening Form.
10. Knowlege of Problem: The PA or PNP will check the appropriate box as to the knowlege of the problem, and if a non-screening problem was found.
11. Reason for Referral: The specific reason for referral is clearly written or printed. Example: The screening step "Dental" has been checked for referral, and the reason "Caries" is written on the referral form.
12. Referred to: The clinic or the place where the problem has been referred to is clearly printed in.
13. Signed: The person making the referral signs the form.
14. Referral Treatment Summary: This portion is completed by the health provider giving the treatment. If further visits are needed, the appropriate box is filled, the boxes are filled for the appropriate steps needed or taken.
15. Follow-up Status: The EPSDT Medical Supervisor fills in the appropriate box for the follow-up status.
16. Total Costs for the Problem: The total cost for the problem is filled in by the person in charge of all charges at the unit where the problem was treated.
17. Referral Number: A unique referral number should be stamped in the box at the bottom right hand corner of the form.

DESTINATION OF REFERRAL FORMS

1. Xerox copy----------EPSDT - with information to Reason for Referral
2. Gold copy ----------RRI - with information to Reason for Referral
3. Pink, White & Yellow -To the place of referral
4. Pink copy ----------To EPSDT file when complete (after child has been treated)
5. Yellow copy----------To RRI when complete (after child has been treatde)
6. White copy----------Clinic chart when complete (after child has been treated)

CHECKERBOARD SCHOOL HEALTH RECORD - IMMUNIZATIONS

ITEMS:

1. Child's Name: Last name is printed in first set of boxes;
   First name is printed in second set of boxes.
2. Child's Number: 'Place child's unique number in the boxes.
3. School: Print the name of the school in which the child attends.
4. Grade: Use the grade in which the child is presently enrolled.
   Follow the same procedure as Item 4 of the Screening Form.
5. Immunizations: Fill in the month, day and year in which each immunization
   was administered, in the appropriate space.

DESTINATION OF IMMUNIZATION FORMS

1. Short Form----------RRI
2. Long Form----------EPSDT records

ATTACHMENT 3

General Record Layout for the Computer Statistical File

General Record Layout for the Statistical File - Example

(Each line represents one record on the tape)

Child No.	Screen No.	Problem No.	Problem Description	Problem Code	Screen Information	Screen Count	Problem Count this Screen	First in Series	First Occur.	Screen Seq.	Other
Child 1	Screen 1	Problem 1	Dental	23	Positive findings by procedures, dates	2	2	1	1	1	—
Child 1	Screen 1	Problem 2	Vision	16	"	2	2	0	0	1	—
Child 1	Screen 2	Problem 1	Anemia	8	"	2	2	1	0	2	—
Child 1	Screen 2	Problem 2	Heart Murmur	13	"	2	2	0	0	2	—
Child 2	Screen 1				"	1	0	1	1	1	—
Child 3	Screen 1				"	2	0	1	1	1	—
Child 3	Screen 2				"	2	0	1	0	2	—

ATTACHMENT 4

Statistical Package for the Social Sciences
Variable List for the Medical File

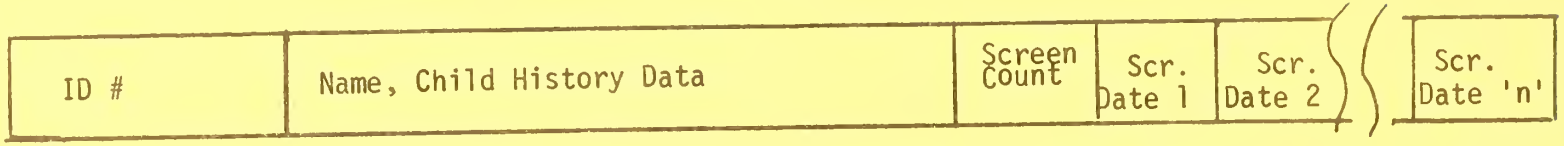
FILE: T2 T A1 ORIGINIO UTHSRI02 SAC COMPUTRE CENTRE REMOTE PRINT FACILITY

SCR001,CHILD NO./
SCR002,* RECORD CR DATE/
SCR003,FIRST OCCURANCE FLAG/
SCR004,MASTER RECORD INACTIVE FLAG/
SCR005,SCREEN COUNT/
SCR006,* SCREEN DELETE FLAG/
SCR007,SCREEN SEQUENCE NO./
SCR008,SCREEN DATE-MM/
SCR009,SCREEN DATE-DD/
SCR010,SCREEN DATE-YY/
SCR011,SCHOOL/
SCR012,GRADE/
SCR013,DOB-MM/
SCR014,DOB-DD/
SCR015,DOB-YY/
SCR016,AGE IN YEARS/
SCR018,ETHNICITY/
SCR019,SEX/
SCR020,EARS-REQ./
SCR021,EARS-STAFF DONE BY/
SCR022,EARS-ABNORMAL/
SCR023,EARS-NOT PERF/
SCR024,EYES-REQ./
SCR025,EYES-STAFF DONE BY/
SCR026,EYES-ABNORMAL/
SCR027,EYES-NOT PERF/
SCR028,NOSE & THROAT-REQ/
SCR029,NOSE & THROAT-STAFF DONE BY/
SCR030,NOSE & THROAT-ABNORMAL/
SCR031,NOSE & THROAT-NOT PERF./
SCR032,SKIN-REQ./
SCR033,SKIN-STAFF DONE BY/
SCR034,SKIN-ABNORMAL/
SCR035,SKIN-NOT PERF/
SCR036,HEART-REQ./
SCR037,HEART-STAFF DONE BY/
SCR038,HEART-ABNORMAL/
SCR039,HEART-NOT PERF./
SCR040,RESPIR-REQ./
SCR041,RESPIR-STAFF DONE BY/
SCR042,RESPIR-ABNORMAL/
SCR043,RESPIR-NOT PERF./
SCR044,ORTHO-REQ./
SCR045,ORTHO-STAFF DONE BY/
SCR046,ORTHO-ABNORMAL/
SCR047,ORTHO-NOT PERF./
SCR048,OTHER PHYS-REQ./
SCR049,OTHER PHYS-STAFF DONE BY/
SCR050,OTHER PHYS-ABNORMAL/
SCR051,OTHER PHYS-NOT PERF./
SCR052,HCT.-REQ./
SCR053,HCT.-STAFF DONE BY/
SCR054,HCT.-ABNORMAL/
SCR055,HCT.-NOT PERF./
SCR056,TRACHOMA-REQ./
SCR057,TRACHOMA-STAFF DONE BY/
SCR058,TRACHOMA-ABNORMAL/
SCR059,TRACHOMA-NOT PERF./
SCR060,UA.-REQ./
SCR061,UA.-STAFF DONE BY/
SCR062,UA.-ABNORMAL/
SCR063,UA.-NOT PERF./
SCR064,TB.-REQ./
SCR065,TB.-STAFF DONE BY/
SCR066,TB.-ABNORMAL/
SCR067,TB.-NOT PERF./
SCR068,HEARING-REQ./
SCR069,HEARING-STAFF DONE BY/
SCR070,HEARING-ABNORMAL/
SCR071,HEARING-NOT PERF./
SCR072,VISION-REQ./
SCR073,VISION-STAFF DONE BY/
SCR074,VISION-ABNORMAL/
SCR075,VISION-NOT PERF./
SCR076,DENTAL-REQ./
SCR077,DENTAL-STAFF DONE BY/
SCR078,DENTAL-ABNORMAL/
SCR079,DENTAL-NOT PERF./
SCR080,OTHER-REQ./
SCR081,OTHER-STAFF DONE BY/
SCR082,OTHER-ABNORMAL/
SCR083,OTHER-NOT PERF./
SCR084,HEIGHT PCTILE/
SCR085,WEIGHT PCTILE/
SCR086,HEALTHINESS RATING-CURR/
SCR087,HEALTHINESS R 6MOS W TRT/
SCR088,HEALTHINESS R 6MOS W O TRT/
SCR089,DPT/
SCR090,OPV/
SCR091,MEASLES/
SCR092,RUBELLA/
SCR093,NO. OF CONTACTS TO CURRENT/
SCR094,IMM. RECORDS SOURCE/
SCR095,FIRST IN SERIES FLAG/
SCR096,PROBLEM COUNT THIS SCREEN/
PRB001,* PROBLEM DELETE FLAG/
PRB002,* PROBLEM SEQUENCE NO./
PRB003,* PROBLEM FORM NO./
PRB004,PROBLEM POSTFIX/
PRB005,REF DATE-MM/
PRB006,REF DATE-DD/
PRB007,REF DATE-YY/
PRB008,PROBLEM HISTORY/
PRB009,NON-SCREEN REF. FLAG/
PRB010,REFERRED TO/
PRB011,DIAGNOSIS 1 CODE/
PRB012, S2 DATE RECEIVED FLAG/
PRB013, TRT DATE-MM/
PRB014, TRT DATE-DD/
PRB015, TRT DATE-YY/
PRB016,DOES PROBLEM EXIST/
PRB017,DIAGNOSIS 2/
PRB018,ACUTE OR CHRONIC/
PRB019,SYMPTO V. ASYMPTO/
PRB020,SERIOUSNESS RATING/
PRB021,DID DOCTOR TREAT THIS PROBLE
PRB022,IF TREATED-/
PRB023,IF NOT TRTD,WHY NOT/
PRB024,FOLLOW UP STATUS/
PRB025,PROBLEM INACTIVE REASON/
PRB026,REASON FOR INACTIVE STATUS/
PRB027,PROBLEM COST DATA/
PRB028,COST DATE/

ATTACHMENT 5

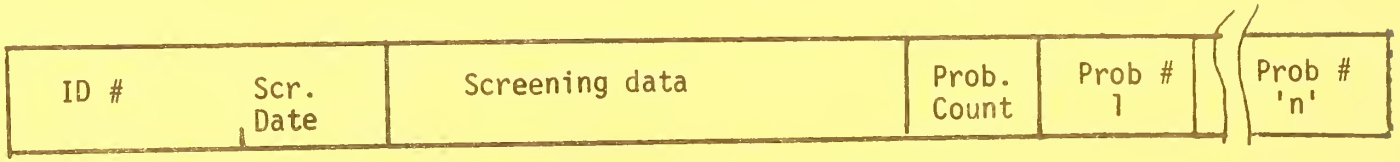
Generalized Computer File Structure for HSRI EPSDT Evaluation

Master Record
(1 per child)



Screen count = # of screen dates in list.

Screen Record
(1 per screen)



Problem Count = Tally of Problem Sheet #s in List.

Problem Record
(1 per problem)

Family Record
(1 per family)

FILE KEYS:

File	Key
1. Master	Child's #
2. Screen	Child's # + Screen Date
3. Problem	Problem Sheet #
4. Family	Family portion of Child's #

ATTACHMENT 6

Psycho-Educational Screening Score Sheet
(for Developmental Screening) and
Instructions--Form A and B

PSYCHO - EDUCATIONAL SCREENING SCORE SHEET

Name _____ (Last) _____ (First) Test Date _____ (Yr Mon Day)

Identification Number _____ (Family) _____ (Child) Sex Male ☐ Female ☐ Grade K B 1 2 _____ (School) Birth Date _____ (Yr Mon Day)

Ethnicity N S A O _____ (Society, if other) Time to give test (min.) _____ Test Conditions 1 2 3 4 5 (1 Very Poor, 5 Ideal) Age _____ (Yr Mon Day)

SECTION (Circle One Number Each)	L								H
1. Intellectual Functioning	1	2	3	4	5	6	7	8	9
2. Visual Motor Perception	1	2	3	4	5	6	7	8	9
3. Language Facility	1	2	3	4	5	6	7	8	9
4. Emotional Adjustment	1	2	3	4	5	6			

SOCIOGRAM
- Star ☐
- Isolate ☐
- Refused to choose ☐
- Not done ☐
- No. times chosen: 1st choice ☐, 2nd choice ☐

1. INTELLECTUAL FUNCTIONING
(positive indicators)

Testor ☐☐ Time ☐☐:☐☐

a. HFD

- ____ smile
- ____ good facial detail
- ____ good clothing detail
- ____ good hand detail
- ____ good proportion
- ____ neck
- ____ profile
- ____ joints
- ____ movements
- ____ action

Indicators	Weighting
3-10	7-9
1-2	4-6
0	1-3

No. of indicators ☐☐ Weighted Score ☐

b. Picture Completion — Raw Score ☐☐; Scaled Score ☐☐; Weighted Score ☐

c. Block Design — Raw Score ☐☐; Scaled Score ☐☐; Weighted Score ☐

Language: English ☐ Spanish ☐ Navajo ☐ Eng-Spanish ☐ Eng-Navajo ☐

2. VISUAL MOTOR

Testor ☐☐

S.D. from the Mean	Weighting
Minus more than (1) S.D.	7-9
Plus or minus (1) S.D.	4-6
Plus more than (1) S.D.	1-3

Raw Score ☐☐ Weighted Score ☐

3. LANGUAGE FACILITY (English)
Wechsler Vocabulary

Testor ☐☐

Scaled score	Weighting
14 or more	7-9
7-13	4-6
6 or less	1-3

Raw Score ☐☐ Sealed Score ☐☐ Weighted Score ☐

4. EMOTIONAL ADJUSTMENT
(negative indicators - use either a or b)

Testor ☐☐

a. HFD

- ____ asymmetry of limbs
- ____ slanting figure
- ____ tiny figure
- ____ tiny head
- ____ short arms
- ____ long arms
- ____ arms clinging to body
- ____ big hands
- ____ hands cut off
- ____ grotesque figure

Omissions
- ____ eyes
- ____ mouth
- ____ body
- ____ legs

Indicators	Weighting
0-1	4-6
2 or more	1-3

Number of negative indicators ☐☐
Number of omissions ☐☐
Total number of indicators ☐☐
Weighted score ☐

b. Bender Gestalt

- Confused order ☐
- Wavy line ☐
- Dashes for circle ☐
- Increasing size ☐
- Large size ☐
- Small size ☐
- Fine line ☐
- Overwork ☐
- Second attempt ☐
- Expansion ☐

Indicators	Weighting
0	4-6
1 or more	1-3

Time to administer Bender Gestalt ☐☐

Number of indicators ☐☐
Weighted score ☐

4. c. Behavioral Observations

Easily Distracted	1	2	3	4	5	Very Attentive	Hypoactive	1	2	3	4	5	Hyperactive
Withdrawn	1	2	3	4	5	Aggressive	Non-verbal	1	2	3	4	5	Very verbal
HFD very immature looking	1	2	3	4	5	HFD very mature looking	Resistant to testing	1	2	3	4	5	Very cooperative
HFD teeth, angry looking	1	2	3	4	5	HFD smiles, lacks hostility	Little praise needed	1	2	3	4	5	Extreme need for praise
Drawing quality Impoverished	1	2	3	4	5	Rich	Poor rapport	1	2	3	4	5	Rapport easily established

SPECIAL NOTES

1. Grooming

Unkempt 1 2 3 4 5 Clean, well groomed

2. Does child wear glasses? Yes ☐ No ☐

3. Handedness Left ☐ Right ☐ Mixed ☐

4. Any obvious medical problems? Yes ☐ No ☐

Explain _____

TEACHER

Teacher's name _____

Teacher's rating of child

1. Emotional Adjustment

Poorly Adjusted 1 2 3 4 5 Well Adjusted

Compare teacher's response to test results

	Comments	Agrees	Disagrees
2. Intellectual		☐	☐
3. Visual motor		☐	☐
4. Language		☐	☐
5. Emotional		☐	☐
6. Sociogram		☐	☐

Teacher Receptivity: Took notes? Yes ☐ No ☐

1. Use teacher will make of information

Little or no use 1 2 3 4 5 Extensive use

2. Comments on teacher response to feedback _____

STATUS	Yes	No
Further needs	☐	☐
Rescreening required	☐	☐
Areas _____		
Diagnostic testing required	☐	☐
Priority testing indicated	☐	☐

Comments:

LISTINGS OF ALL CHILDREN SCREENED

MASTER-MASTER LIST: The master-master list is a list of all children who have had developmental and/or Diagnostic screening preformed. In alphabetical order.

A. Child's Number
B. Name
C. Ethnicity
D. Parents Name
E. School Attended during Screening

MASTER LIST: The master list is a list of all children who have had developmental screening preformed. In alphabetical order.

A. Child's Number
B. Name
C. Date of Birth
D. Parents Name
E. Ethnicity

SCHOOL BY GRADE ALPHABETICAL LIST: This list is a list of all the children who have had developmental screening preformed.

A. Child's Number
B. Name
C. Area to Screen
D. Sociogram of the last screening year not recorded on form
E. Reason for not being tested in previous year.

DIAGNOSTIC MASTER LIST: All diagnostic testing preformed.

A. Child's number
B. Name
C. Ethnicity
D. Parents Name
E. School Attended during Screening

HO-EDUCATIONAL SCREENING SCORE SHEET ---- K-3

Items:

1. Child's Name: Last name is printed in first set of boxes; First name is printed in second set of boxes.
2. Test Date: This is the date of the actual screening preformed.
3. Identification Number: Place the child's unique number in the boxes.
4. Sex: Check the appropriate box -- Male or Female.
5. Grade: Circle the appropriate grade which the child is presently enrolled.
   a. K - Kindergarten
   b. B - Beginners
   c. 1 - First
   d. 2 - Second
6. School: Print the name of the school which the child attends.
7. Birth Date: The first two boxes are used for the last two digits of the current year; The second set of two boxes are used for the numeric month value - 01 = January, 02 = February..... 12 = December, The last two set of boxes are used for the day - 01 to 31.
8. Ethnicity: Circle the appropriate initial for the ethnicity of the child. If other than N, S, or A write ethnicity in appropriate blank.
   a. N - Navajo
   b. S - Spanish
   c. A - Anglo
   d. O - Other _____
9. Time to give test (min.): In the two boxes provided for the time write in how many minutes it took the child to complete the test.
10. Test Conditions: Circle the appropriate number for the conditions in which the tests were given. The scale ranges from 1 = very poor to 5 = Ideal.
11. Age: The exact age of the child is needed; subtract the child's birthdate from the screening or test date to get the exact age.
12. Section: (Circle one number for each) A 1-2-3 (Low), 4-5-6 (Average) 7-8-9 (High) scale is provided for each of the findings.
    a. Intellectual Functioning
    b. Visual Motor Perception
    c. Language Facility
    d. Emotional Adjustment
13. Sociogram: A box is designated for each of the resulting codes found in the sociogram taken for each grade.
    a. Star
    b. Isolate
    c. Refused to choose
    d. Not done
    e. No. of times chosen first
    f. No. of times chosen second

14. Intellectual Functioning: A section on the scoring sheet has been blocked for scoring the test given.

    a. Testor, each testor has a definite number assigned, boxes are provided for the number.
    b. Time, boxes are provided to fill in the time a child takes to complete the test.
    c. HFD - a list of positive indicators are printed for checking on the Human Figure Drawing.
    d. Indicators - numbers are in the screening form for testing results, boxes are also provided.
    e. Weighting - numbers are in the screening form for the weighted score, boxes are also provided.
    f. Picture Completion - boxes are provided for Raw Score, Scaled Score and Weighted Score.
    g. Block Design - boxes are provided for Raw Score, Scaled Score and Weighted Score.
    h. Language - boxes are provided for checking in which language the test was given.

15. Visual Motor: A section on the scoring sheet has been blocked for scoring the test given.

    a. Testor - each testor has a definite number assigned, boxes are provided for the number.
    b. Standard Deviation (from the Mean) - and the weighting scores are written in for indicating test results.
    c. Boxes are provided for Raw and Weighted Score results.

16. Language Facility: A section on the scoring sheet has been blocked for scoring the Language Facility (Wechsler Vocabulary).

    a. Testor - each testor has a definite number assigned, boxes are provided for the number.
    b. Scaled Score, Weighting - numbers are written in for checking the child's scaled and weighting score.
    c. Raw Score, Scaled Score, Weighted Score - boxes are provided for the three score results.

17. Emotional Adjustment: A section on the scoring sheet has been blocked for scoring the test given.

    a. Testor - each testor has a definite number assigned, boxes are provided for the number.
    b. Negative indicators (use either A or B)

        A. HFD - a list of negative indicators is provided for checking .

        Omissions - a list of omissions is provided for checking.

        Indicators and Weighting - a section for the indicators and wwighting scores is provided with numbered scores.

Boxes are provided for Number of indicators, Number of Omissions, Total Number of Indicators and Weighted score.

B. Bender Gestalt - Boxes are provided for the Bender indicators.

Confused order
Wavy line
Dashes for circle
Increasing size
Large size
Small size
Fine line
Overwork
Second attempt
Expansion (more than one paper used)

A box is provided with Indicators, Weighting and the time to administer Bender Gestalt, for scoring results.

18. Behavioral Observations: Scales are provided from 1-5 for behavioral observations.

a. Easily Distracted ----- Very Attentive
b. Withdrawn ----- Aggressive
c. HFD very immature looking ----- HFD very mature looking
d. HFD teeth, angry looking ----- HFD smiles, lacks hostility
e. Drawing quality impoverished ----- Rich
f. Hypoactive ----- Hyperactive
g. Non-verbal ----- Very verbal
h. Resistant to testing ----- very cooperative
i. Little praise needed ----- Extreme need for praise
j. Poor rapport ----- Rapport easily established

19. Special Notes: A section for special notes is provided.

A. Grooming - a one to five scale is provided

Unkept 1 2 3 4 5 Clean, well groomed

B. Any obvious medical problem? Yes - No Explain

C. Does Child wear glasses?

D. Handedness - Left - Right - Mixed

20. Teacher: Teacher's name

A. Teacher's rating of child

1. Emotional Adjustment - a scale is provided (1-5 Scale)
   a. 1 = Poorly Adjusted
   b. 5 = Well Adjusted

B. Comments - a blank line is provided for teacher's comments

1. Intellectual
2. Visual Motor
3. Language
4. Emotional
5. Sociogram

C. Compare teacher's response to test results- blocks designating the teacher's agreeing or disagreeing with the test results on items 1-5 in section B previously shown or on item 1 in section A previously shown.

D. Teacher Receptivity - Took notes? Yes - No

1. Use teacher will make of information - a 1-5 scale is provided. 1 = Little or no use, 5 = Extensive use.

2. Comments on teacher response to feedback - lines are provided for teacher's response to feedback.

21. Status: A section is provided for the child's status.

A. Further needs Yes No
Rescreening required Yes No
Areas _____
Diagnostic testing required Yes No
Priority testing indicated Yes No

PSYCHO · EDUCATIONAL SCREENING SCORE SHEET (Form B)

Name _____ (Last) _____ (First) Test Date _____ (Yr Mon Day)

Identification Number _____ (Family) _____ (Child) Sex Male ☐ Female ☐ Grade 3 4 5 _____ (School) Birth Date _____ (Yr Mon Day)

Ethnicity N S A O _____ (Society, if other) Time to give test (min.) _____ Test Conditions 1 2 3 4 5 (1 = Very Poor, 5 = Ideal) Age _____ (Yr Mon Day)

SECTION (Circle One Number Each)	L								H
1. Intellectual Functioning	1	2	3	4	5	6	7	8	9
2. Visual Motor Perception	1	2	3	4	5	6	7	8	9
3. Achievement (word recognition)	1	2	3	4	5	6	7	8	9
4. Emotional Adjustment	1	2	3	4	5	6			

SOCIOGRAM

- Star ☐
- Isolate ☐
- Refused to choose ☐
- Not done ☐
- No. times 1st choice ☐ chosen 2nd choice ☐

1. INTELLECTUAL FUNCTIONING

tester ☐☐

	Indiv. Adm.	Group Adm.
D-A-P raw score		
CA		
MA		
Discrepancy		
EST		
Weighted score		

9 MA 24 mos. above CA (24+)
8 MA 18 mos. above CA (18 - 23)
7 MA 12 mos. above CA (12 - 17)
6 MA 6 mos. above CA (6 - 11)
5 MA same as CA (0 - 5)
4 MA 6 mos. below CA (6 - 11)
3 MA 12 mos. below CA (12 - 17)
2 MA 18 mos. below CA (18 - 23)
1 MA 24 mos. below CA (24+)

b. Picture Completion

Raw Score ☐☐
Scaled Score ☐☐
Weighted Score ☐

c. Block Design

Raw Score ☐☐
Scaled Score ☐☐
Weighted Score ☐

2. VISUAL MOTOR

tester ☐☐

S.D. from the Mean	Weighting
Minus more than (1) S.D.	7-9
Plus or minus (1) S.D.	4-6
Plus more than (1) S.D.	1-3

	Indiv. Adm.	Group Adm.
Error score		
Weighted score		

3. ACHIEVEMENT

tester ☐☐

(wide range — word recognition)

Present grade ☐ Raw score ☐☐
Grade equivalent ☐☐ Wtd. score ☐
Discrepancy ☐

9 GE 24 mos. above GL (24+)
8 GE 18 mos. above GL (18 - 23)
7 GE 12 mos. above GL (12 - 17)
6 GE 6 mos. above GL (6 - 11)
5 GE same as GL (0 - 5)
4 GE 6 mos. below GL (6 - 11)
3 GE 12 mos. below GL (12 - 17)
2 GE 18 mos. below GL (18 - 23)
1 GE 24 mos. below GL (24+)

4. EMOTIONAL ADJUSTMENT

tester ☐☐

a. Draw-A-Person

Poor integration	☐	Big hands	☐
Shading, face	☐	Hands cut off	☐
Shading, body, limbs	☐	Legs together	☐
Shading, hands, neck	☐	Genitals	☐
Asymmetry of limbs	☐	Monster, grotesque	☐
Slanting figure	☐	Three figures	☐
Tiny figure	☐	Clouds, rain	☐
Big figure	☐	No eyes	☐
Transparencies	☐	No nose	☐
Tiny head	☐	No mouth	☐
Crossed eyes	☐	No body	☐
Teeth	☐	No arms	☐
Short arms	☐	No legs	☐
Long arms	☐	No feet	☐
Arms clinging	☐	No neck	☐

Total no. of indicators Indiv. adm. ☐☐ Grp. adm. ☐☐

4. EMOTIONAL ADJUSTMENT (continued)

b. Bender Gestalt tester ☐☐

confused order	☐	small size	☐
wavy line	☐	fine line	☐
dashes for circle	☐	overwork	☐
increasing size	☐	second attempt	☐
large size	☐	expansion	☐

	Indiv. Adm.	Grp. Adm.
Total no. emot. indic.		
Weighted score		

5. TEACHER RANKING

Position from the bottom of class _____

SPECIAL NOTES

1. Does child wear glasses? Yes ☐ No ☐
2. Handedness Left ☐ Right ☐ Mixed ☐
3. Any obvious medical problems? Yes ☐ No ☐

Explain _____

TEACHER

Teacher's name _____

Teacher's Comments	Compare teacher's response to test results: Agrees	Disagrees
1. Intellectual _____	☐	☐
2. Visual motor _____	☐	☐
3. Achievement _____	☐	☐
4. Emotional _____	☐	☐
5. Sociogram _____	☐	☐

Teacher Receptivity: Took notes? Yes ☐ No ☐

1. Use teacher will make of information

Little or no use 1 2 3 4 5 Extensive use

2. Comments on teacher response to feedback _____

STATUS	Yes	No
Further needs	☐	☐
Rescreening required	☐	☐
Areas _____		
Diagnostic testing required	☐	☐
Priority testing indicated	☐	☐

Comments:

CHO-EDUCATIONAL SCREENING SCORE SHEET (Form B) 3-5

ITEMS:

1 through 13: Use the same procedure as in items 1 through 13 in PSYCHO-EDUCATIONAL SCREENING SCORE SHEET ---- K-3.

14. Intellectual Functioning: A section on the scoring sheet has been blocked for scoring the test given.

A. Tester - each tester has a definite number assigned, boxes are provided for the number.

B. Individual Administered or Group Administered - A box is provided for giving information as to how each of the following was administered.

1. DAP raw score
2. Cronic Age
3. Mental Age
4. Discrepancy
5. EST

Weighted Score

C. A table identifying the Mental and Chronic Age by age and score is provided for tallying.

15. Picture Completion: Boxes for the Raw Score, Scales Score and Weighted Score are provided.

16. Block Design: Boxes for the Raw Score, Scaled Score and Weighted Score are provided.

17. Visual Motor: A section on the scoring sheet has been blocked for scoring the test given.

A. Tester - each tester has a definite number assigned, boxes are provided for the tester number.

B. S.D. from the Mean- and the weighting scores are written in for indicating test results.

C. Individual Administered or Group Administered - A box is provided for giving information as to how each of the following was administered.

1. Error score
2. Weighted score

18. Achievement: A section on the scoring sheet has been blocked for scoring achievement. (wide range - word recognition)

A. Tester - each tester has a definite number assigned, boxes are provided for the tester number.

B. Present grade

C. Grade equivalent

D. Discrepancy

E. Raw score

F. Weighted Score

G. A table identifying the Grade Equivalent and Grade level by age and score is provided for tallying.

19. Emotional Adjustment: A section on the scoring sheet has been blocked for Emotional Adjustment test results.

A. Tester - each tester has a definite number assigned boxes are provided for the tester number.

B. Draw-A-Person - A list for checking any and all indicators is provided for scoring.

C. Total no. of indicators - boxes are provided to fill in number of indicators and if administered individually or as a group.

D. Bender Gestalt - Boxes are provided for the Bender indicators; the indicators are listed with a box next to each indicator for checking.

E. Boxes are provided for Total no. of emotional indicators, weighted score and if individually administered or administered as a group.

20. Teacher Ranking: A section is provided for the teacher ranking the pupils, position from the bottom of the class.

21. Special Notes: A section for special notes is provided.

A. Does child wear glasses: Yes No

B. Handedness
1. Left
2. Right
3. Mixed

C. Any obvious medical problems? Yes No - Explain _____

22. Teacher: Teacher's name

A. Teacher's Comments - a blank line is provided for teacher's comments on:

1. Intellectual
2. Visual motor
3. Achievement
4. Emotional
5. Sociogram

B. Compare teacher's response to test results - blocks designating the teacher's agreeing or disagreeing with the test results on items 1-5 in section A previously shown .

C. Teacher Receptivity - Took notes? YES NO

1. Use teacher will make of information - a 1-5 scale is provided. 1 = Little or no use, 5 = Extensive use.

2. Comments on teacher response to feedback - lines are provided for teacher's response to feedback.

23. Status: A section is provided for the child's status.

A. Further needs	YES	NO
Rescreening required	YES	NO
Areas		
Diagnostic testing required	YES	NO
Priority testing indicated	YES	NO

DISTRIBUTION OF ALL SCREENING FORMS

1. White copy ---------- EPSDT Child's file
2. Yellow copy --------- RRI for computer process and feedback

ATTACHMENT 7

Statistical Package for the Social Sciences
Variable List for Developmental Screening

```
IDNO,C-FAMILY CHILD ID NO/
NAME1,C-CHILDS NAME/
NAME2,C-CHILDS NAME/
NAME3,C-CHILDS NAME/
NAME4,C-CHILDS NAME/
NAME5,C-CHILDS NAME/
NAME6,C-CHILDS NAME/
VAR009,C-TEST DATE YEAR/
VAR010,C-TEST DATE MONTH/
VAR011,C-TEST DATE DAY/
VAR012,C-BIRTHDATE YEAR/
VAR013,C-BIRTHDATE MONTH/
VARo14,C-BIRTHDATE DAY/
VAR015,C-AGE IN YEARS/
VAR016,C-AGE IN MONTHS/
VAR017,C-AGE DAYS/
VAR018,C-SEX/
VAR019,C-GRADE/
VAR020,C-SCHOOL/
VAR021,C-ETHNICITY/
VAR022,C-TOTAL TIME SPENT MINUTES/
VAR023,C-TEST CONDITIONS/
VAR024,C-CHILDS ATTITUDE/
VAR025,C-LANGUAGE USED IN TESTING/
VAR026,C-INTELLECT FUNC SCORE/
VAR027,C-VIS MOTOR PERCEP SCORE/
VAR028,C-LANG FACILITY SCORE/
VAR029,C-EMOTIONAL ADJ SCORE/
VAR030,C-STAR SOCIOGRAM/
VAR031,C-ISOLATE SOCIOGRAM/
VAR032,C-REFUSED TO CHOSE SOCIOGRAM/
VAR033,C-NOT DONE SOCIOGRAM/
VAR034,C-NO OF TIMES FIRST CHOICE/
VAR035,C-NO OF TIMES SECOND CHOICE/
VAR036,C-INTELLECTUAL TESTER/
VAR037,C-TIME MINUTES INTELLECTUAL/
VAR038,C-TIME SECONDS INTELLECTUAL/
VAR039,A-SMILE HFD/
VAR040,A-GOOD FACIAL DETAIL HFD/
VAR041,A-GOOD CLOTHING DETAIL HFD/
VAR042,A-GOOD HAND DETAIL HFD/
VAR043,A-GOOD PROPORTION HFD/
VAR044,A-NECK HFD/
VAR045,A-PROFILE HFD/
VAR046,A-JOINTS HFD/
VAR047,A-MOVEMENTS HFD/
VAR048,A-ACTION HFD/
VAR049,A-NO OF INDICATORS HFD/
VAR050,B-INTELLECTUAL FUNCT DAP RAW SCORE/
VAR051,B-INTELLECTUAL FUNCT CHRON AGE/
VAR052,B-INTELLECTUAL FUNCT MENTAL AGE/
VAR053,B-INTELLECTUAL FUNCT DISCREPANCY/
VAR054,B-INTELLECTUAL FUNCT EST/
VAR055,B-PIC COMPLETION RAW SCORE/
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VAR056,C-PIC COMPLETION SCALED SCORE/
VAR057,C-PIC COMPLETION WID SCORE/
VAR058,C-BLOCK DESIGN TESTER/
VAR059,C-BLOCK DESIGN RAW SCORE/
VAR060,C-BLOCK DESIGN SCALED SCORE/
VAR061,A-BLOCK DESIGN WID SCORE/
VAR062,C-WEIGHTED SCORE INTELLECTUAL/
VAR063,C-VISUAL MOTOR TESTER/
VAR064,C-VISUAL MOTOR ERROR SCORE/
VAR065,C-VISUAL MOTOR WEIGHTED SCORE/
VAR066,C-LANGUAGE-ACHIEVEMENT-TESTER/
VAR067,C-LANGUAGE RAW SCORE/
VAR068,C-LANGUAGE SCALED SCORE/
VAR069,C-LANGUAGE WEIGHTED SCORE/
VAR070,B-ACHIEVEMENT PRESENT GRADE/
VAR071,B-ACHIEVEMENT RAW SCORE/
VAR072,B-ACHIEVEMENT GRADE EQUIVALENT/
VAR073,B-ACHIEVEMENT WEIGHTED SCORE/
VAR074,B-ACHIEVEMENT DISCREPANCY/
VAR075,C-EMOTIONAL ADJUSTMENT TESTER/
VAR076,B-EMO ADJ HFD POOR INTEGRATION/
VAR077,B-EMO ADJ HFD SHADING FACE/
VAR078,B-EMO ADJ HFD SHADING BODY LIMBS/
VAR079,B-EMO ADJ HFD SHADING HANDS NECK/
VAR080,C-EMO ADJ HFD ASYMMETRY OF LIMBS/
VAR081,C-EMO ADJ HFD SLANTING FIGURE/
VAR082,C-EMO ADJ HFD TINY FIGURE/
VAR083,B-EMO ADJ HFD BIG FIGURE/
VAR084,B-EMO ADJ HFD TRANSPARENCIES/
VAR085,C-EMO ADJ HFD TINY HEAD/
VAR086,B-EMO ADJ HFD CROSSED EYES/
VAR087,B-EMO ADJ HFD TEETH/
VAR088,C-EMO ADJ HFD SHORT ARMS/
VAR089,C-EMO ADJ HFD LONG ARMS/
VAR090,C-EMO ADJ HFD ARMS CLINGING/
VAR091,C-EMO ADJ HFD BIG HANDS/
VAR092,C-EMO ADJ HFD HANDS CUT OFF/
VAR093,B-EMO ADJ HFD LEGS TOGETHER/
VAR094,B-EMO ADJ HFD GENITALS/
VAR095,C-EMO ADJ HFD MONSTER GROTESQUE/
VAR096,B-EMO ADJ HFD THREE FIGURES/
VAR097,B-EMO ADJ HFD CLOUDS RAIN/
VAR098,C-EMO ADJ HFD NO EYES/
VAR099,B-EMO ADJ HFD NO NOSE/
VAR100,C-EMO ADJ HFD NO MOUTH/
VAR101,C-EMO ADJ HFD NO BODY/
VAR102,B-EMO ADJ HFD NO ARMS/
VAR103,C-EMO ADJ HFD NO LEGS/
VAR104,B-EMO ADJ HFD NO FEET/
VAR105,B-EMO ADJ HFD NO NECK/
VAR106,A-NO OF NEG INDICATORS HFD EMO ADJ/
VAR107,A-NO OF OMISSIONS HFD EMO ADJ/
VAR108,C-TOTAL NO OF INDICATORS HFD EMO ADJ/
VAR109,C-EMOTIONAL ADJUSTMENT WTD SCORE/
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VAR110,C-EMO ADJ BENDER CONFUSED ORDER/
VAR111,C-EMO ADJ BENDER WAVY LINE/
VAR112,C-EMO ADJ BENDER DASHES FOR CIRCLE/
VAR113,C-EMO AJD BENDER INCREASING SIZE/
VAR114,C-EMO AJD BENDER LARGE SIZE/
VAR115,C-EMO ADJ BENDER SMALL SIZE/
VAR116,C-EMO ADJ BENDER FINE LINE/
VAR117,C-EMO ADJ BENDER OVERWORK/
VAR118,C-EMO ADJ BENDER SECOND ATTEMPT/
VAR119,C-EMO ADJ BENDER EXPANSION/
VAR120,C-EMO ADJ BENDER NO OF INDICATORS/
VAR121,C-EMO ADJ BENDER TIME MIN/
VAR122,C-EMO ADJ BENDER TIME SEC/
VAR123,C-OBVIOUS MEDICAL PROBLEMS/
VAR124,C-HANDEDNESS/
PROJMON,C-CUMULATIVE MONTHS SINCE JAN 73/
SYS1,C-FORM TYPE/
SYS2,C-SCREEN SEQUENCE-CODED/
SYS3,C-GOT DIAGNOSTIC/
SYS4,C-SCREEN SEQUENCE-COMPUTED/
SYS5,C-SCREEN COUNT-COMPUTED/
```

ATTACHMENT 8

New Developmental Forms Containing
Historical Summary of Child's Development

CUBA **PSYCHO-EDUCATIONAL SCREENING SCORE SHEET (FORM A)**

☐ NEW ☐ Absent ☐ Moved _____ Parent's Permission ☐ Yes ☐ N
Location

Child's Name (Last) (First) Test Date (Yr. Mo. Day)

Parent's Name Birth Date

Identification Number (Family) (Child) Sex Male ☐ Female ☐ Grade K B 1 2 _____ School Age

Conflicting Birth Dates ☐ Yes ☐ N

Ethnicity N S A O _____ Society, if other Total Time Spent (min.) Test Conditions 1 2 3 4 5 (1 Very Poor, 5 Ideal) Child's Attitude 1 2 3 4 (1 Uncooperative, 4 coopera

Language: Primary Language used in Testing Situation
☐ English ☐ Spanish ☐ Navajo ☐ Eng-Spanish ☐ Eng-Navajo

SECTION (Circle One Number Each)	L								H
1. Intellectual Functioning	1	2	3	4	5	6	7	8	9
2. Visual Motor Preception	1	2	3	4	5	6	7	8	9
3. Language Facility	1	2	3	4	5	6	7	8	9
4. Emotional Adjustment	1	2	3	4	5	6			

SOCIOGRAM
Star ☐
Isolate ☐
Refused to choose ☐
Not done ☐
No. times chosen 1st choice ☐ 2nd choice ☐

HISTORY AND STATUS

Year	Action S	RS	D	R	None	Needs RS Circle I V L E	RRS Circle I V L E	D	RD	None	See Records
1973-74						I V L E	I V L E				
1974-75						I V L E	I V L E				
1975-76						I V L E	I V L E				
1976-77						I V L E	I V L E				

1. INTELLECTUAL FUNCTIONING (positive indicators) Tester ☐☐ Time Min. ☐☐ : Sec. ☐☐

A. HFD 1st ☐ 2nd ☐

____ smile
____ good facial detail
____ good clothing detail
____ good hand detail
____ good proportion
____ neck
____ profile
____ joints
____ movements
____ action

No. of indications ☐☐ Omitted by: Child ☐ Tester ☐

B. Block Design
Raw Score ☐☐
Scaled Score ☐☐
Omitted By: Child ☐ Tester ☐

INTELLECTUAL FUNCTIONING
Weighted Score ☐

2. VISUAL MOTOR Tester ☐☐
Error Score ☐ Weighted Score ☐
Omitted by: Child ☐ Tester ☐

3. LANGUAGE FACILITY (English) Tester ☐☐
Wechsler Vocabulary
Raw score ☐☐ Scaled Score ☐☐ Weighted Score ☐
Omitted by: Child ☐ Tester ☐

4. EMOTIONAL ADJUSTMENT Tester ☐☐
HFD ☐ 1st ☐ 2nd
(negative indicators)
____ asymmetry of limbs
____ slanting figure
____ tiny figure
____ tiny head
____ short arms
____ long arms
____ arms clinging to body
____ big hands
____ hands cut off
____ grotesque figure

Omissions
____ eyes
____ mouth
____ body
____ legs

Number of negative indicators ☐☐
Number of omissions ☐
Total number of indicators ☐☐

EMOTIONAL ADJUSTMENT Weighted score ☐

Page 2 (Form A)

Last Name _____ First _____

Bender Gestalt

Confused order	☐	Small size	☐
Wavy line	☐	Fine line	☐
Dashes for circle	☐	Overwork	☐
Increasing size	☐	Second attempt	☐
Large size	☐	Expansion	☐

Number of indicators ☐☐

Time to adminster Bender Gestalt ☐☐ : ☐☐ (min. : sec.)

TEACHER

Teacher's name _____

1. Intellectual _____
2. Visual motor _____
3. Language _____
4. Emotional _____
5. Sociogram _____

SPECIAL NOTES

1. Any obvious medical problems? ☐ Yes ☐ No

   Explain _____

2. Handedness

   Left ☐
   Right ☐
   Mixed ☐
   Uncertain ☐
   Not Recorded ☐

CUBA

PSYCHO-EDUCATIONAL SCREENING SCORE SHEET (FORM B)

☐ NEW ☐ Absent ☐ Moved _____ (Location) Parent's Permission ☐ Yes ☐ No

Child's Name (Last / First) Test Date (Yr. Mo. Day)

Parent's Name Birth Date

Identification Number (Family / Child) Sex Male ☐ Female ☐ Grade 3 4 5 _____ (School) Age

Conflicting Birth Dates ☐ Yes ☐ No

Ethnicity N S A O _____ (Society, if other) Total Time Spent (Min.) Test Conditions 1 2 3 4 5 (1 Very Poor, 5 Ideal) Child's Attitude 1 2 3 4 5 (1 Uncooperative, 5 Cooperative)

Language: Primary Language used in Testing Situation

☐ English ☐ Spanish ☐ Navajo ☐ Eng-Spanish ☐ Eng-Navajo

SECTION (Circle ONe Number Each)	L								H
1. Intellectual Functioning	1	2	3	4	5	6	7	8	9
2. Visual Motor Preception	1	2	3	4	5	6	7	8	9
3. Achievement (word recognition)	1	2	3	4	5	6	7	8	9
4. Emotional Adjustment	1	2	3	4	5	6			

SOCIOGRAM

Star ☐
Isolate ☐
Refused to choose ☐
Not done ☐
No. times 1st choice ☐
chosen 2nd choice ☐

HISTORY AND STATUS

Year	Action S	RS	D	R	None	Needs RS Circle I V L E	RRS Circle I V L E	D	RD	None	See Records
1973-74						I V L E	I V L E				
1974-75						I V L E	I V L E				
1975-76						I V L E	I V L E				
1976-77						I V L E	I V L E				

1. INTELLECTUAL FUNCTIONING

Tester ☐☐ 1st ☐ 2nd ☐ Time Min. ☐☐ : Sec. ☐☐

D-A-P raw score					
CA			Years		Months
MA			Years		Months
Discrepancy		+ / –			Months
EST					

Omitted by: Child ☐ Tester ☐

B. Block Design (Wisc-R)

Tester ☐☐
Raw Score ☐☐
Scaled Score ☐☐

Omitted by: Child ☐ Tester ☐

Intellectual Functioning

Weighted Score ☐

2. VISUAL MOTOR

Tester ☐☐

Error Score ☐☐ Weighted Score ☐

Omitted by: Child ☐ Testor ☐

3. ACHIEVEMENT (wide range – word recognition) Tester ☐☐

Present grade GR MO ☐☐ Raw Score ☐☐

Grade equivalent GR MO ☐☐ Wtd. score ☐

Discrepancy + / – ☐ ☐☐ Months

Omitted by: Child ☐ Tester ☐

VOCABULARY (WISC)

Raw Score ☐☐
Scaled Score ☐☐
Weighted Score ☐

Omitted by: Child ☐ Tester ☐

Page 2 (Form B)

Last Name _____ First _____

4. EMOTIONAL ADJUSTMENT

a. H.F.D. 1st ☐ 2nd ☐

Poor integration	☐	Big Hands	☐
Shading, face	☐	Hands cut off	☐
Shading, body, limbs	☐	Legs together	☐
Shading, hands, neck	☐	Genitals	☐
Asymmetry of limbs	☐	Monster, grotesque	☐
Slanting figure	☐	Three figures	☐
Tiny figure	☐	Clouds, rain	☐
Big figure	☐	No eyes	☐
Transparencies	☐	No nose	☐
Tiny head	☐	No mouth	☐
Crossed eyes	☐	No body	☐
Teeth	☐	No arms	☐
Short arms	☐	No legs	☐
Long arms	☐	No feet	☐
Arms clinging	☐	No neck	☐

Total no. of indicators ☐☐

b. Bender Gestalt

Confused order	☐	Small size	☐
Wavy line	☐	Fine line	☐
Dashes for circle	☐	Overwork	☐
Increasing size	☐	Second attempt	☐
Large size	☐	Expansion	☐

Number of indicators ☐☐

Time to adminster Bender Gestalt ☐☐ : ☐☐ (min. : sec.)

EMOTIONAL ADJUSTMENT Weighted score ☐

TEACHER

Teacher's name _____

1. Intellectual _____
2. Visual motor _____
3. Language _____
4. Emotional _____
5. Sociogram _____

SPECIAL NOTES

1. Any obvious medical problems? ☐ Yes ☐ No

   Explain _____

2. Handedness
   - Left ☐
   - Right ☐
   - Mixed ☐
   - Uncertain ☐
   - Not Recorded ☐